SOUTHERN POWER AND INDUSTRY

Ad Index, page 164

MAY, 1954

In This Issue

Chemical Scale Removal . . 70
Dow Chemical, Freeport, Texas

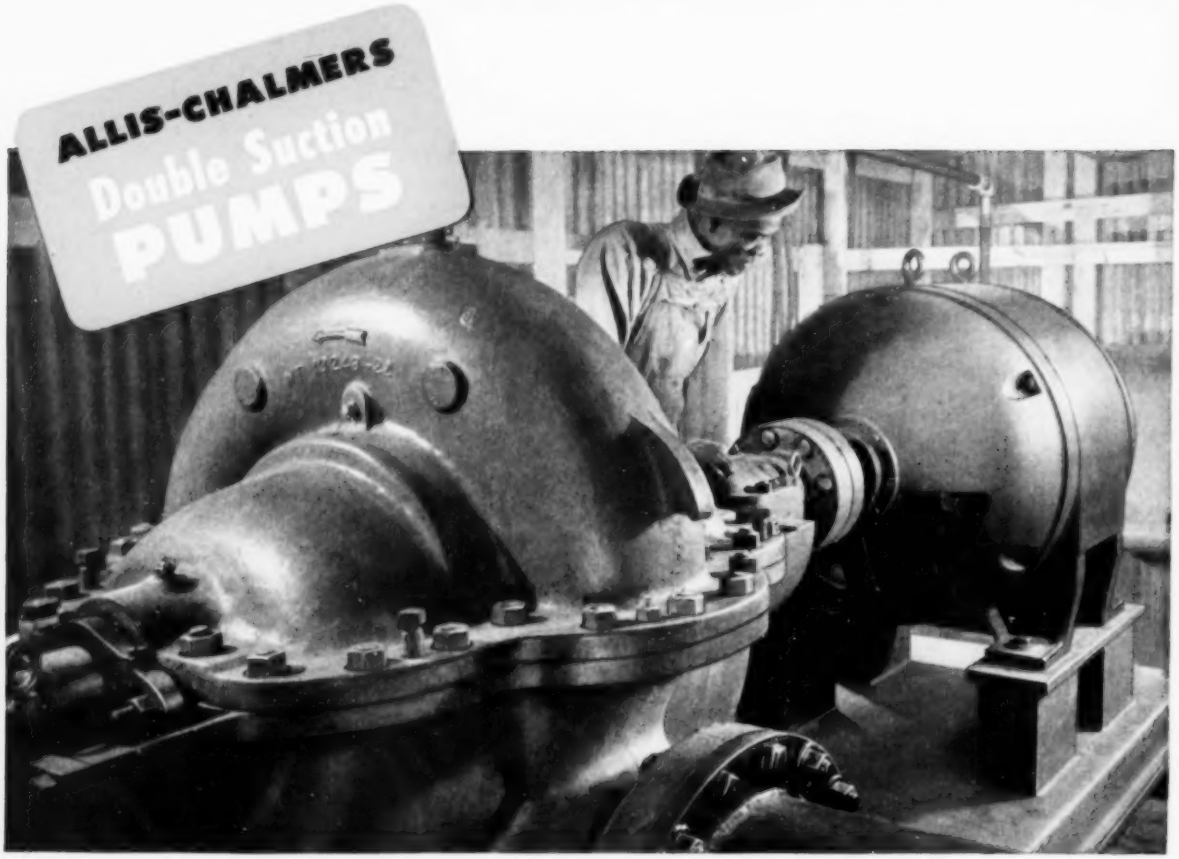
Instruments & Controls . . 72
American Enka, Lowland, Tennessee

Small Boiler Plants 78
Tested maintenance procedures

Turbine Overhaul Study . . 88
Arkansas Power and Light Company

See Complete Table of Contents . . . . . Page 3

Eighth Annual Maintenance Issue



CUT PUMPING COSTS

Get an Allis-Chalmers pump with:

- **HEAVY DUTY CONSTRUCTION** — Extra metal thicknesses, extra strong parts, no skimping.
- **WIDE MATERIAL CHOICE** — Iron, bronze, stainless steels and combinations to handle practically any liquid.
- **MANY OPTIONAL FEATURES** — Choice of sealing methods and bearing arrangements for special requirements.
- **UNIT RESPONSIBILITY** — Pump, motor and control — a complete unit — supplied and guaranteed by Allis-Chalmers.

FOR ALL GENERAL USES AND MANY SPECIAL PROCESS APPLICATIONS, Allis-Chalmers double suction pumps are built with that extra measure of strength and ruggedness that assures you long life and low maintenance.

Every Allis-Chalmers double suction pump is carefully tested on the most modern electronically controlled pump testing equipment in the industry. Each installation is individually engineered by men whose experience in thousands of pump installations will give exactly the right pump for your needs.

Whatever your pumping problem, call your nearby Allis-Chalmers Authorized Dealer or District Office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 08B6146.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters, push button stations and components for complete control systems.

TEXROPE V-belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

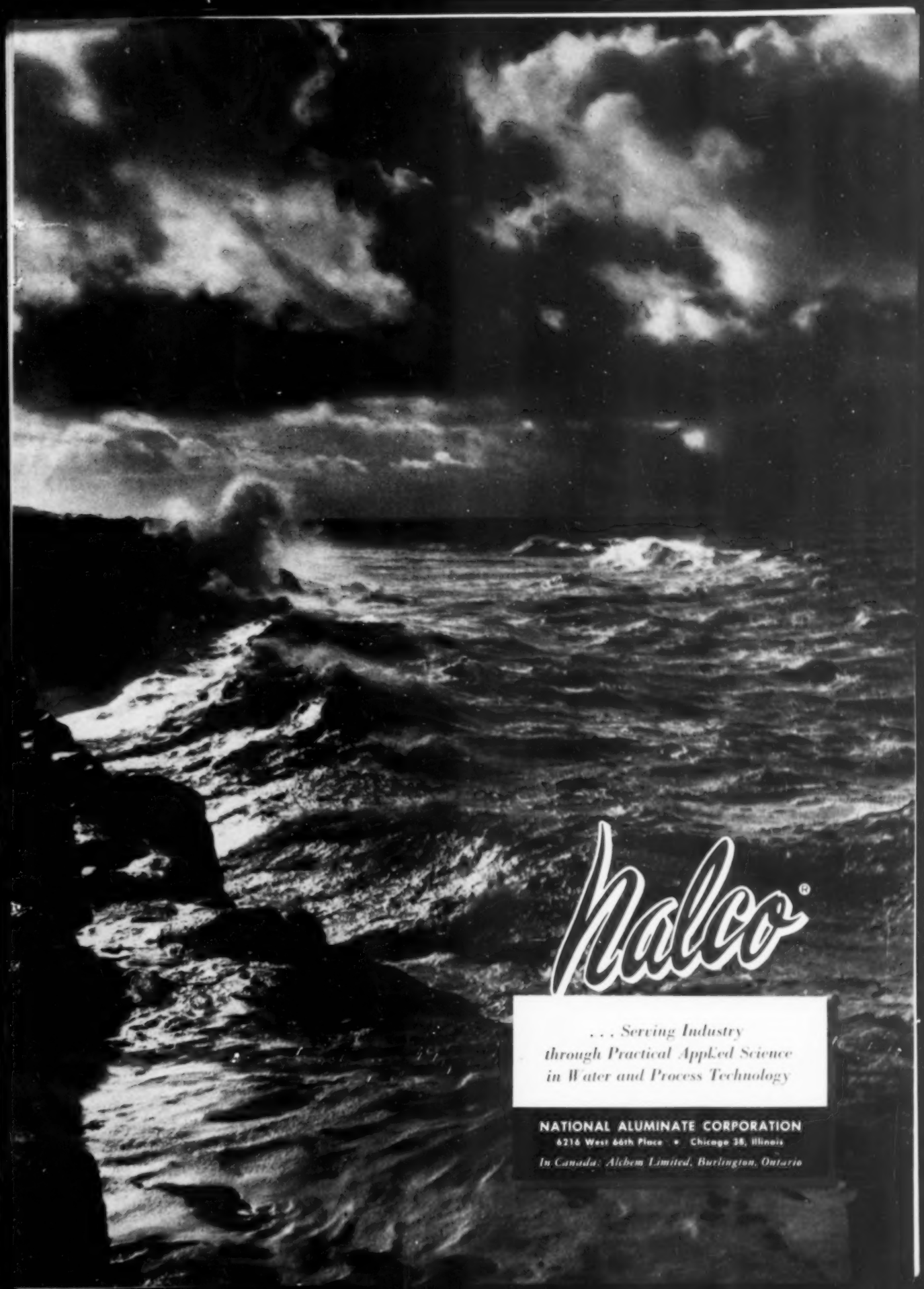
Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

A-4287

ALLIS-CHALMERS

SOUTHERN POWER & INDUSTRY is published monthly at 56th & Chestnut Sts., Philadelphia 39, Pa., by W. R. C. Smith Publishing Co.
Executive and Editorial Offices: 806 Peachtree St., N.E., Atlanta 5, Ga. Entered as second class matter at the Post Office, Philadelphia, Pa.
Subscription Rates: United States and Possessions, $1.00 per year or three years for $2.00. Foreign Countries, $10.00 per year.

Volume 72 Number 5


halco®
. . . Serving Industry
through Practical Applied Science
in Water and Process Technology
NATIONAL ALUMINATE CORPORATION
6216 West 66th Place • Chicago 38, Illinois
In Canada: Alchem Limited, Burlington, Ontario

MATERIALS HANDLING!

There's a Continental Conveyor for every industry.

When you have a conveying or elevating problem — — specify *Continental*

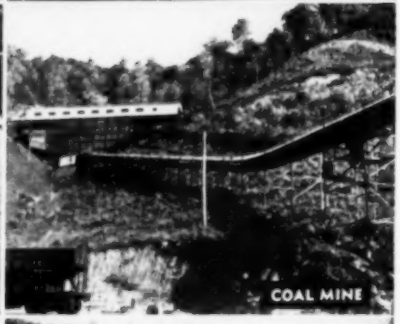
STEAM GENERATING PLANT

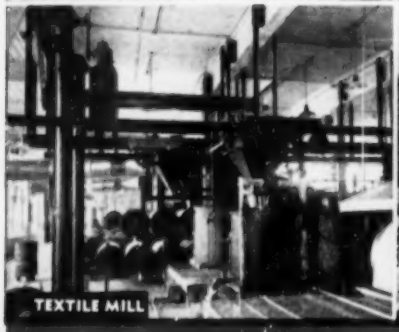
FERTILIZER PLANT

COTTONSEED OIL MILL

GRAIN HANDLING

FEED MILL


COAL MINE


TEXTILE MILL

CEMENT PLANT

QUARRY

BELT CONVEYORS, SCREW CONVEYORS, APRON CONVEYORS, BUCKET ELEVATORS
PLATE OR APRON FEEDERS, TRIPPERS, BELT BRUSHES, PULLEYS, SPROCKETS AND CHAIN
PILLOW BLOCKS, BELTING, SPEED REDUCERS, POWER TRANSMISSION EQUIPMENT
FABRICATED STEEL, MEEHANITE CASTINGS, SPECIAL MACHINE WORK

Send us your orders and inquiries.

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

SOUTHERN POWER AND INDUSTRY

MAY 1954

Vol. 72 No. 5

Eugene W. O'Brien, Managing Director

•

Francis C. Smith, Editor

Richard L. Priess ..... Associate Editor

Milton F. May ..... Field Editor

John F. Lee ..... Consultant on Atomics

M. M. Lyon ..... Associate

•

J. A. Moody, Production Manager

•

Business Representatives

E. L. Rogers, 299 Madison Ave., New York 17, N. Y.—Phone Murray Hill 2-4959.

George Isherwood, 413 Alexander Ave., Drexel Hill, Pa.—Phone, Clearbrook 9-4536.

J. D. Parsons, 39 Atlantic Ave., Cohasset, Mass.—Phone, 4-0712.

A. E. C. Smith, P. O. Box 3054, Cleveland 17, Ohio.—Phone Cherry 1-7352.

Maynard L. Durham, 333 North Michigan Ave., Chicago 1, Ill.—Phone, Central 6-6964.

L. R. Chappell, 6399 Wilshire Blvd., Los Angeles 48, Calif.—Phone, Webster 3-9241.

Karl H. Mayers (for N. J. north of Trenton) 11 Ale Wives Road, R.F.D. 2, Norwalk, Conn.—Phone, Temple 8-2187.

W. Cliff Rutland, 1762 Poston Circle, Gastonia, N. C.—Phone 7995.

•

Annual Subscription—$1.00
Foreign—$10.00

•

Published monthly by
W. R. C. SMITH PUB. CO.
Atlanta, Ga., and Philadelphia, Pa.

Publishers also of *Textile Industries, Electrical South, Southern Hardware, Southern Automotive Journal, Southern Building Supplies, and Southern Appliances.*

W. J. Rooke, Chairman of the Board; R. P. Smith, President; T. W. McAllister, Vice-President; E. W. O'Brien, Vice-President; A. E. C. Smith, Vice-President.

CONTENTS—Eighth Annual Maintenance Issue

Planned Overhauls —Key to Productive Maintenance 69
New Orleans sales engineer gives worthwhile comments

Removing Scale With Chemicals, by J. P. Warren 70
Wherever steam and water flow in Texas plant

Instrument and Control Maintenance, by W. G. Baker, Jr. 72
Equipment, methods and system in Tennessee plant

Deferred Maintenance Program, by F. C. Clayton 74
Financing problem in government owned Texas facility

Electrical Maintenance Subcontracted 77
Reversing the "do-it-yourself" trend in Florida

Small Boiler Plant Maintenance, by Denard L. Gusler 78
Five Southern plants provide procedure experience

Maintenance Grinding Techniques, by Roger M. Perry, Jr. 82
A few general purpose types will serve most purposes

Pointers on Conveyor Belts, by Wilbur G. Hudson 86
These precautions will help cut maintenance costs

Turbine Overhaul Outage Reduced, by Glenn Edwards 88
An Arkansas Power and Light Company case study

Solving Boiler Cleaning Problems, by S. F. Walleze 92
Why modern blowers and deslaggers are important

Fork-Lift Trucks Can Handle Many Jobs 98
Make full use of your versatile handling equipment

Your Chimney Maintenance, by Clark Nichols 100
When does deterioration start? How about repairs?

Plant Maintenance Ideas, Methods and Suggestions

Electronic Tube Maintenance	106	Motor Starter Troubles	116
Electric Welder Connections	106	Steam Trap Maintenance	116
Shop Coolant Pump	108	Versatile Pipe Jack	118
Maintenance in Small Plant	110	Cutting Torch Guide	118
Bearing Life Upped	112	Painting Link Fences	120
Paint Stripping Technique	112	Handling Industrial Hose	120
V-Belt Drive Tension	112	Roller Chain Troubles	124
Abrasion Problems Solved	116	Electrical Crews	124

DEPARTMENTS—Facts and Trends 6; Buyers Information 16; Timely Comments 67; Industry Speaks 69; News 12; Future Events 12; New Equipment 126; Maintenance Aids 158; Books for the Plant Engineer 160; Index to Advertisers 164.

Contents Indexed regularly by Engineering Index, Inc.

Copyrighted 1954 by W. R. C. Smith Publishing Company

Editorial and Executive Offices: **SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 5, GEORGIA**

SPECIFY I-T-E SWITCHGEAR

FOR

- maximum protection
- maximum service continuity
- maximum value

Switchgear is an *important* purchase. That's why you should investigate the many advantages of I-T-E quality equipment. They add up to a sound investment which pays yearly dividends in complete electrical protection and service continuity.

Maximum protection—I-T-E switchgear contains industry-proved air circuit breakers engineered for long, trouble-free performance.

Maximum service continuity—The OD-2 trip device provides true coordinated selective tripping for the most effective type of circuit protection.

Maximum value—The modern I-T-E switchboard incorporates, along with I-T-E breakers, the highest quality bus, instrument transformers, control wiring, and required accessories. And to save you time and money . . . to assure the best application of equipment to every job, I-T-E provides the maximum of individual engineering assistance.

Switchgear is truly an investment. Specify I-T-E, and receive extra dividends now and throughout the life of the equipment.

For Details Contact the I-T-E Field Office nearest you

SOUTHERN REGIONAL OFFICE—ATLANTA, GEORGIA

BIRMINGHAM, ALABAMA
Jos. W. Eshelman & Co., Inc.,
1812 28th Ave., So., Homewood

DALLAS, TEXAS
Butler & Land,
5538 Dyer St.

JACKSONVILLE, FLORIDA
Robert P. Smith & Co.,
2031 Hendricks Ave.

CHARLOTTE, N. C.
E. H. Gilliam Co.,
106 N. Caldwell St.

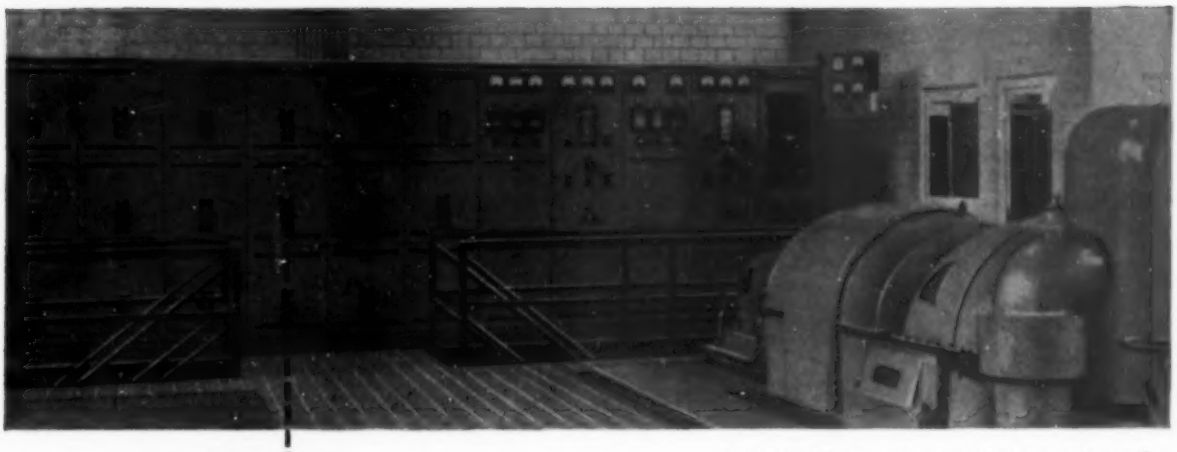
HOUSTON, TEXAS
I-T-E Circuit Breaker Co.,
2032 Dunlavy St.

NEW ORLEANS, LA.
Gregory-Salisbury & Co.,
820 Julia St.

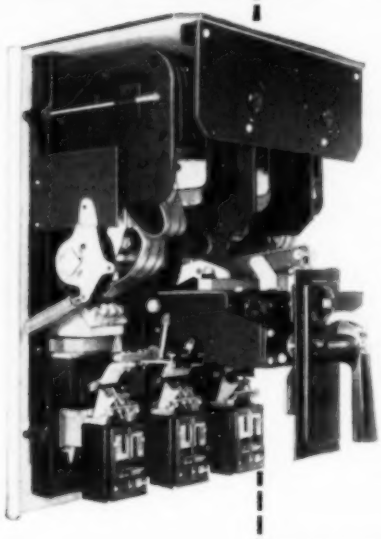
THE SYMBOL OF QUALITY SWITCHGEAR

I-T-E CIRCUIT BREAKER COMPANY

19TH AND HAMILTON STS., PHILADELPHIA 30, PA.



Typical I-T-E low-voltage switchgear installation for modern, efficient control of power generators.

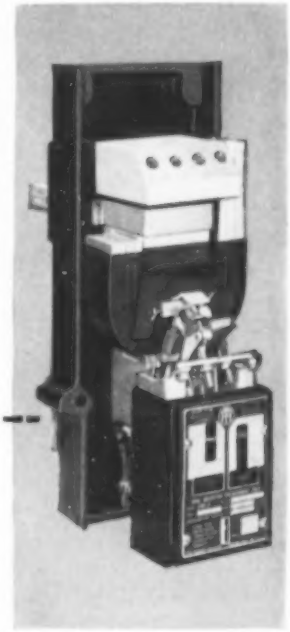


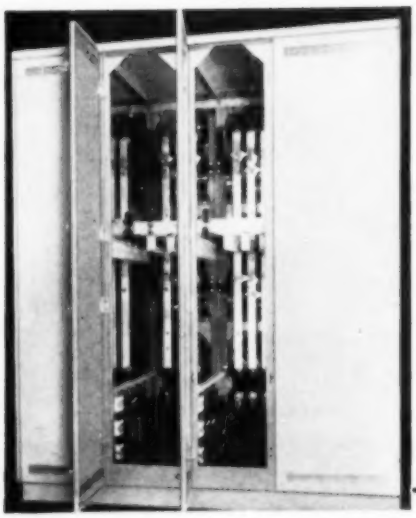
PROVED CIRCUIT PROTECTION

I-T-E air circuit breakers are sturdy, metal-base units with complete insulation of all current-carrying parts. The high-pressure silver contacts are strong, durable, and fast operating. Reliable contact action and efficient magnetic arc chutes assure positive interruption in a small space. Maximum flexibility, simplified testing and inspection are made possible by the horizontal drawout feature.

COORDINATED "SELECTIVE TRIPPING"

This *direct-acting* OD-2 trip device isolates system faults by tripping only the breaker nearest the fault. The OD-2 is a compact, shock-resistant, sealed unit. "Dual selective," it offers precise long-time delay in seconds and minutes, and short-time delay in cycles.





ENGINEERED FOR SERVICE

The entire switchboard is carefully engineered to provide accessibility of components . . . safety for personnel . . . long life . . . ease of operation. Typical of its convenient design is the rear section with its full-height hinged doors. Rugged, structure-high frames eliminate the need for cross-bracing. Thus cable connections can be made simply and easily. Main horizontal bus is located deep inside the compartment—a construction feature which allows ample space for instrument transformers, bus duct, and cable connections. Generous-sized bus is braced to withstand maximum short-circuit conditions.

LOW-VOLTAGE SWITCHGEAR

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

May, 1954

► REVERSING THE DO-IT-YOURSELF TREND, two Florida and Georgia cigar plants are subcontracting their electrical maintenance work. They feel that a well-staffed electrical contracting company can furnish more economical and efficient electrical maintenance than the company could even though it has work enough for full-time electricians.

In absence of electrician (illness, vacations, etc.) electrical contractor can furnish substitute without additional cost to plant. If there is a major breakdown, additional help can be quickly obtained from the contractor. When important equipment changes are made, contractor is in a position to supply full crew to make them quickly. Finally, the companies know that the contractor's advice is constantly available as to electrical layouts, hookups, etc.

► REDWOOD DETERIORATION IN COOLING TOWERS has confronted Gulf Coast engineers for the past five years. Since 1950, the Cooling Tower Institute, California Redwood Association, and a group of tower users have worked together to determine the causes and specify remedies for the different types of abnormal redwood deterioration.

Summary of the work done and conclusions reached to date are reported in COOLING TOWER WOOD MAINTENANCE, available at 20 cents per copy from the Cooling Tower Institute, Palo Alto, Calif. Corrective recommendations include: maintain pH value between 7 and 7.5; control sodium carbonate by treating with sulfuric acid to convert it to sodium sulphate; maintain chlorine residual below 1 ppm; maintain lower operating temperatures; and employ adequate sanitation measures.

► STEAM TRAP NOTATION--Maintenance money can be saved by replacing parts not only in the trap requiring immediate attention, but also in the remaining traps of that series.

Assume that eight inverted bucket traps are installed on an eight-coil dryer. Several traps draining the same machine receive approximately the same wear. When one becomes worn to the extent of needing new parts, the others will be soon to follow.

If the remaining traps have an average of 10% service life before requiring repair, and cost of new valve, seat and lever assembly were $4, replacement before it was absolutely necessary would involve a loss of $.40 per trap. However, labor and outage costs involved will more than make up for this loss.

► FLUORESCENT LIGHT DIMMING SYSTEMS now being installed offer several advantages over filament lamps--higher efficiency over the dimming range, lower operating costs, and better color control. While filament lamps become increasingly red as they are dimmed, fluorescent lamps change very little in color over their entire brightness range.

The G-E system features a dimming ballast for each operating lamp, a thyratron unit and an intensity selector. Circuit is designed for 40 watt rapid-start lamps. Dimmer does not depend on varying lamp voltage to control light output; it controls the time during which voltage is applied. Changes in light output result from changes in the length of time that current flows through the lamp during each cycle.

(Continued on page 8)

UP and UP and UP
SAFELY
· with ·
KERRIGAN
Weldforged
TRADEMARK
Stair Treads
Kerrigan anti-slip steel grating and stair treads, Weldforged into strong, INSEPARABLE units (Bonderized for rust resistance) afford maximum light and ventilation plus minimum maintenance through long years of trouble-free use.
Write for catalog and specification sheets and a FREE copy of the interesting booklet, "A Picture Story of KERRIGAN."
We have a few openings for agents in the South and Southwest in cities where we are not listed in classified telephone directories.
KERRIGAN IRON WORKS, INC.
NASHVILLE, TENNESSEE
GENERAL SALES OFFICE: 274 MADISON AVE., NEW YORK CITY

facts and trends (continued from page 6)

► MAINTENANCE FINANCING can become quite complicated in a government owned plant. Maintenance is an overhead cost, which is an item of major consideration in letting of government contracts on a "cost plus a fixed fee" basis, such as is common in the aircraft industry.

Convair in Fort Worth, Texas, had the problem. Money available for maintenance is a function of plant activity, usually measured in direct man-hours. At high levels of activity, funds are relatively plentiful; but at low activity, little maintenance money is available.

But, at high levels of activity all machines, equipment and floor space are utilized and cannot be spared from production for major maintenance. Conversely, when the plant is not busy and equipment is relatively idle, no money is available for overhauling it.

In this issue of SP&I, F. C. Clayton, chief engineer of Convair, discusses the problem and outlines their DEFERRED MAINTENANCE PROGRAM, which was superimposed on the plant engineering department's normal functions of routine maintenance and repair.

► PAINTING TECHNIQUES for chain link fences offer a note of simplicity. First came the ordinary PAINT BRUSH method. At best, it was a long tedious job. SPRAY PAINTING produced good results but required a large amount of relatively expensive equipment. Then the LAMB'S WOOL ROLLER found some faithful followers. Now we read that the cheapest, easiest and quickest method is with an ordinary FLOOR PUSH BROOM. It's a one man operation with minimum equipment--broom, paint and container.

► NEW V-BELT SLIDEFILMS, of interest to the maintenance man and plant engineer, are now available from the Allis-Chalmers General Machinery Division offices. IN EVERY V-BELT DRIVE covers engineering principles; FOR BETTER DRIVING concerns installation and maintenance of multiple drives; and SELECTING A DRIVE tells how to check characteristics to find the best type of drive and then engineer it to do the job.

► COLOR-CONDITIONING can influence employee health, morale and production. Maintenance paint costs are no greater when a plant is "color-conditioned." The same quantity of paint used in regular maintenance painting; planned application of the right colors results in greater all-around efficiency.

Machines can be painted so that a soft, light-reflecting color "spotlights" the work area for the operator. Colors and patterns can be combined to warn of such hazards as traveling equipment, inside stairways, elevators and barriers.

► CARBIDE WENT OUTDOORS WITH POWER at Texas City, Texas, to meet plant expansion demands of nearly 400,000 lb of steam and 5,000 kw of additional power. New outdoor plant features two 200,000 lb/hr pressurized furnace steam generators, inter-tube design gas burners, pneumatic primary feed-water and combustion control, and miniature indicators and control units.

Max A. Ladt, supervisor of Carbide and Carbon Chemicals' No. 2 steam and power plant, will describe the design and operational features in SP&I for June. The mild climate at Texas City is admirably suited for an outdoor plant, and since most of the process units at Texas City have the major equipment outdoors, that philosophy of operation was extended to steam and power production.

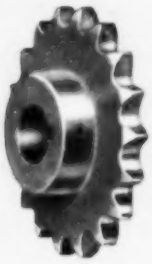
Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

LABELED AND PACKAGED FOR YOUR CONVENIENCE

"OVER-THE-COUNTER" DRIVES OF...

Packaged 10' lengths of Chain. Reels for 50' lengths and over.

Pitch	Roller Width	Chain No.
3/8"	3/16"	DIAMOND No. 82 AM. STD. No. 35
1/2"	1/4"	DIAMOND No. 41 AM. STD. No. 41
1/2"	5/16"	DIAMOND No. 66 AM. STD. No. 40
5/8"	3/8"	DIAMOND No. 449 AM. STD. No. 50
3/4"	1/2"	DIAMOND No. 433 AM. STD. No. 60
1"	5/8"	DIAMOND No. 434 AM. STD. No. 80



Finished Bore precision-made Sprockets, complete keyways and setscrews. Many bores and tooth sizes.

Taper-Lock Sprockets with replaceable bushings to meet wide range of bores.

DIAMOND ROLLER CHAINS AND SPROCKETS

The constantly increasing use of Diamond Roller Chain for power transfer has made possible the wider range of Finished-Bore Sprockets which with the Taper-Lock replaceable bushing type Sprockets for the large bores, provide stock drives to meet the vast majority of requirements.

RE-WORKING ELIMINATED

Since Diamond Finished-Bore Sprockets are complete with keyways and setscrews and are available from stock in 75 tooth sizes with more than 280 accurately finished bores—the job of re-working as required by conventional minimum bore sprockets is eliminated.

QUICKER SERVICE AND DELIVERY

This combination of packaged Diamond Roller Chains in American Standard sizes, wide range of solid sprockets and the Taper-Lock replaceable bushed sprockets, provide for quick delivery from distributors. New Catalog 753 gives all details.

DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

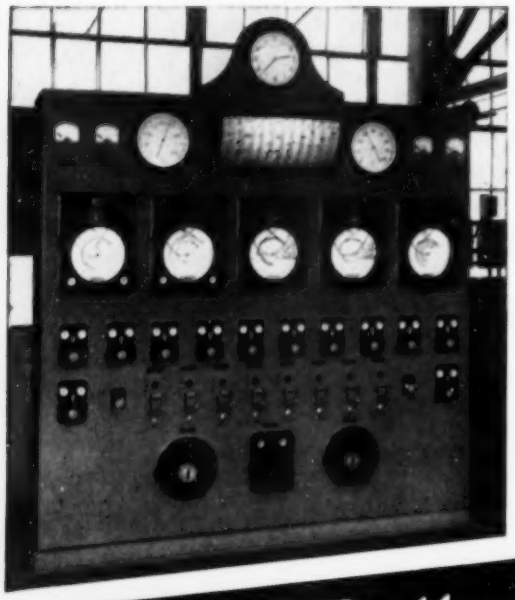
Dept. 612, 402 Kentucky Avenue, Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

See the yellow pages of your classified telephone directory for the address of the Diamond Chain distributor

DIAMOND ROLLER CHAINS

Write for latest literature



This Bailey Boiler Control Panel in a mid-western industrial plant saves fuel and insures safe operation of a 100,000 lb per hr, 175 psi, sat., pulverized coal and gas-fired boiler.

What's Your Control-Dollar Efficiency?

Control-dollars frequently bring annual investment returns of 100% or more. When you buy adequate, well-applied steam plant controls, you increase your dollars' ability to work usefully for you.

That's where Bailey can help: Bailey Controls can give you a better control-dollar efficiency. Here's why:

1. **Complete Range of Equipment—fully co-ordinated.** You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer *complete* boiler control systems.

2. **Engineering Service—backed by experience.** No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.

3. **Direct Sales-Service — conveniently located near you.** Bailey Meter Company's sales-service engineers are located in more industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

•

For better control-dollar efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

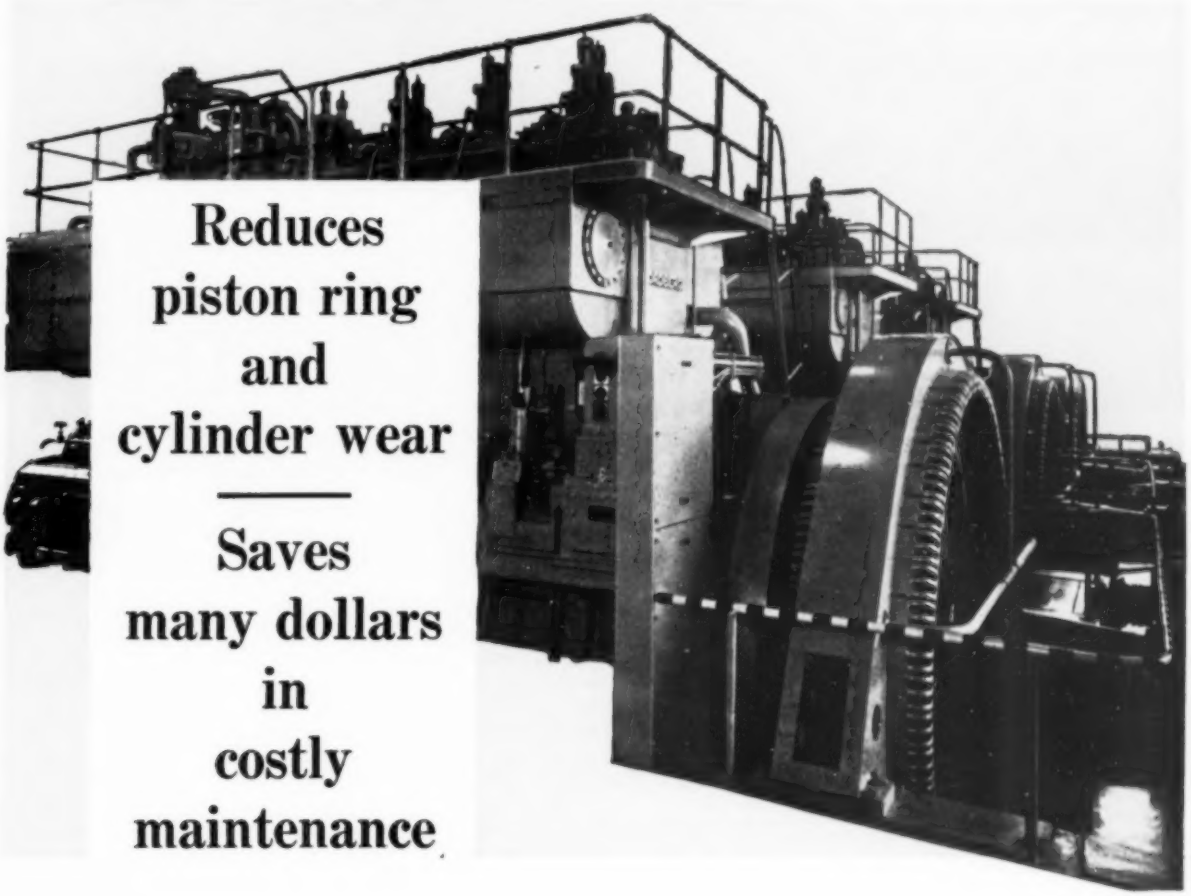
A-112-1

BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

Controls for Steam Plants
COMBUSTION · FEED WATER
TEMPERATURE · PRESSURE
LIQUID LEVEL · FEED PUMPS

Shell Rotella Oil



Reduces piston ring and cylinder wear

Saves many dollars in costly maintenance

These dual-fuel engines in the Municipal Power Plant at Houma, Louisiana, supply dependable, low-cost electric power to the entire city. Shell Rotella Oil is the cylinder lubricant.

Here's just one of the many diesel power plants that depend on SHELL ROTELLA OIL for reduced wear of engine parts . . . lower maintenance cost.

The anti-corrosive action in Shell Rotella Oil combats the major cause of engine wear . . . cylinder and piston ring wear caused by acid action from the by-products of incomplete combustion and condensation.

Tougher lubricating film in Shell Rotella Oil gives cylinders and rings greater protection . . . minimizes wear. Its effective detergent-dispersant action prevents harmful deposits.

Write for technical information. See for yourself how Shell Rotella Oil can help reduce your engine maintenance costs.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK

100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL®

NEWS *for the South and Southwest*

General view from the highway of Mississippi Chemical's plant with the office in the foreground, nitric acid, ammonia storage facilities in the background toward the right, gas reforming plant in the center background, and the compressor section of ammonia synthesis in the left background.

Mississippi Chemical Corp. Expansion—Yazoo City

THE MISSISSIPPI CHEMICAL CORPORATION, YAZOO CITY, MISS., completed one phase of their expansion program during the week of February 15 when they put into operation 60 additional tons per day of ammonia capacity. Within one week from the date the plant was purged for startup preparations the unit was producing in excess of its rated capacity, which brings MCC's ammonia production facilities up to in excess of 180 tons per day.

The Mississippi Chemical Corporation process for gas reforming consists of a single stage reformer operating at 15 lb outlet pressure followed by CO conversion and MEA scrubbing for CO$_2$ removal. The gas is then compressed to 1000 atmospheres prior to high pressure methanation and ammonia synthesis using the Claude ammonia synthesis process.

A continuation of MCC's expansion program for this year consists of constructing a low pressure methanation unit which will remove all the carbon monoxide prior to compression. This will result in additional compressor capacity as well as free the present high pressure methanator for use as an ammonia converter. This step will be followed by additional reforming capacity and compression which will ultimately bring total capacity up to in the neighborhood of 290 tons per day. MCC also started construction the first of February on a 120 ton addition to the nitric acid facilities.

Construction was also started in January on MCC's new ammonium nitrate prilling unit which will bring their total prilling capacity to approximately 500 tons of ammonium nitrate per day.

FUTURE EVENTS
Of Engineering Interest

AMERICAN WELDING SOCIETY, Joseph G. Magrath, Sec'y, 29 W. 39th St., New York 18, N. Y.
May 4-7, Second Welding & Allied Industry Exposition, Memorial Auditorium, Buffalo, N. Y.

SOUTHEASTERN ELECTRIC EXCHANGE, J. W. Talley, Mg. Dir., 303 Haas-Howell Bldg., Atlanta 3, Ga.
May 6-7, Engineering and Operation Section, Sans Souci Hotel, Miami, Fla.

BASIC MATERIALS EXPOSITION, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
May 17-20, Basic Materials Exposition and Conference, International Amphitheatre, Chicago, Ill.

WORLD TRADE INSTITUTE, World Trade Committee, Houston Chamber of Commerce, Houston, Texas.
May 17-20, First World Trade Institute, University of Houston, Houston, Texas.

OIL TIMERS CLUB OF THE OIL BURNER INDUSTRY, H. A. Maccubbin, Sec'y, 129 W. Madison St., Villa Park, Ill.
May 18, Annual Meeting and Dinner Party, Philadelphia Rifle Club, 7th & Tabor Road, Philadelphia, Pa.

THE SOCIETY OF THE PLASTICS INDUSTRY, INC., Wm. T. Cruse, Exec. V. P., 295 Madison Ave., New York 17, N. Y.
June 6-11, 8Sth National Plastics Exposition, Cleveland Auditorium, Cleveland, Ohio.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 W. 39th St., New York 18, N. Y.
June 14-17, Annual Conference & Exhibit of the Oil and Gas Power Division, Hotel Muehlback, Kansas City, Mo.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, H. H. Henline, Sec'y, 33 W. 39th St., New York 18, N. Y.
June 21-25, Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, Calif.

INSTRUMENT SOCIETY OF AMERICA, Mg. Dir., First International Instrument Congress & Exposition, 845 Ridge Ave., Pittsburgh 12, Pa.
Sept. 15-21, First International Instrument Exposition, Philadelphia Convention Hall, Philadelphia, Pa.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS, Robert W. McKinnon, Exec. Sec'y, 5 Franklin Road, Roanoke, Va.
Sept. 16-18, Thirty-sixth Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Harold M. Furtney, Chm. Tulsa Section, 1610 E. 32nd Place, Tulsa 5, Okla.
Sept. 27-29, Electrical Conference for the Petroleum Industry, Mayo Hotel, Tulsa, Okla.

PETROLEUM ELECTRIC POWER ASSOCIATION, W. L. Pearson, Sec'y-Treas., P. O. Box 1261, Amarillo, Texas.
Oct. 4-6, Twenty-sixth Anniversary Meeting, Jung Hotel, New Orleans, La.

General Time Corp. Builds New Athens, Georgia Plant

Excavation has been completed and foundations poured for GENERAL TIME CORPORATION'S new million dollar ATHENS, GA., clock plant, with July set as the completion date for the project.

The single-story 400 ft by 280 ft

(Continued on page 14)

DEAERATING EFFICIENCY

less than seven parts per billion guaranteed!

These are words. What you want is *PERFORMANCE.* Cochrane's unparalleled experience in years and number of installations with all types of deaerating equipment assures you that *guarantees will be met!* Check this statement with any Cochrane user.

Cochrane has the greatest number of deaerating heater installations of any manufacturer in the world. Manufacturing every type of deaerating heater and water conditioning equipment, Cochrane's *complete* service assures you unbiased recommendations for equipment to performance specifications. It assures undivided responsibility for engineering, fabrication and satisfactory continuing operation by a single company.

For further information on Cochrane Deaerators, write for Publication Nos. 3005, 4643 and 4635.

Other Cochrane Processes

DEMINERALIZER

Cochrane ion exchange units deliver a continuous supply of demineralized silica-free water at extremely low cost. Pub. No. 5800.

HOT ZEOLITE

Replaces second stage phosphate treatment in hot-process softener. High temperature ion exchange resins completely remove residual hardness at great savings in soda ash and phosphate. Pub. No. 4801.

SOLIDS CONTACT REACTOR

Slurry blanket principle efficiently removes solids, turbidity, color, taste, silica, fluorides, and reduces alkalinity from water for industrial and municipal purposes. Pub. No. 5001-A.

COCHRANE CORPORATION · WATER ENGINEERS FOR 91 YEARS · 1863 1954

Cochrane

CORPORATION

3110 17th STREET, PHILADELPHIA 32, PA.

Representatives in 30 principal cities in U. S.; Toronto, Canada; Mexico City, Mexico; Paris, France; Havana, Cuba; Caracas, Venezuela; San Juan, Puerto Rico; Honolulu, Hawaii.

Pottstown Metal Products Division—Custom built carbon steel and alloy products

COCHRANE CORPORATION
3110 NO. 17TH ST., PHILA. 32, PA.

Send me a copy of Publication Nos. 3005, 4643, 4635, 5800, 4801, 5001-A. (Circle publication desired).

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Demineralizers • Hot Process Softeners • Hot Zeolite Softeners • Dealkalizers • Reactors • Deaerators • Continuous Blow-Off • C-B Systems • Specialties

News for the South and Southwest (continued)

(*Starts on page* 12)

building will provide manufacturing area of 120,000 sq ft. It will be air conditioned throughout.

Equipment for the complete manufacture of Westclox synchronous electric clocks, including automatic screw machines, punch presses, metal finishing equipment, plastic molding, final assembly and testing equipment, will be installed in the building.

Walter Kidde Constructors Inc. of New York City is engineer for the project. Daniel Construction Company of Greenville, S. C., and Birmingham, Ala., is the builder.

New $1,700,000 Unit for International Nickel, W. Va.

Engineering innovations for product protection, high-accuracy "print-weight" scales, and one of the largest truck terminals in metal warehousing, are some of the features of THE INTERNATIONAL NICKEL COMPANY'S new distribution center at HUNTINGTON, W. VA.

Planned and engineered to speed operations, the recently completed $1,700,000 unit will greatly improve handling of materials from the point of shipment. The new center has the latest equipment for straightening, cutting and inspecting its metal products. Among these are Inco Nickel Alloys in the form of sheet, strip, rod, wire and tubing, which are "tailor-made" specialties of the Huntington Works. The plant produces more than 400 separate products in 19,000 different sizes.

The distribution center, which will increase warehouse facilities by 50%, comprises three 60-ft bays in which there are three overhead cranes. In ground dimensions, the center covers an area of 400 by 180 ft with an adjoining covered storage yard, 400 by 80 ft, serviced by a fourth crane. In addition to tracks of the plant railroad, a Chesapeake and Ohio Railway spur track services the center. Seven truck docks, easily accessible by a new road, eliminate the necessity of trucks traversing the main plant grounds.

G.E. Expansion—Rome, Ga.

Construction contracts totaling approximately $500,000 for additions to the GENERAL ELECTRIC COMPANY'S new Medium Transformer Plant at Rome, Ga., have been awarded to three Georgia firms, it was announced today by D. B. LAWTON, Plant Manager.

The three firms are Batson-Cooke Company, West Point, Ga., General Contractors; Fischbach & Moore, Inc., Atlanta, Electrical Subcontractors; and Seckinger Sons Co., Inc., Atlanta, Mechanical Subcontractors.

The new construction, Mr. Lawton said, includes a cafeteria for employees, addition of a complete bay for the manufacture of paper wound insulating tubes and a new continuous operation annealing furnace. Total cost of the expansion, after installation of equipment, will exceed $2,000,000.

The continuous operation annealing furnace will greatly reduce the time now required for annealing the thin sheet steel used in making laminations for transformer cores. With the new annealing furnace, a new type of pre-coated steel will be used.

J. J. Finnigan Company Continues Expansion

The new general office of the J. J. FINNIGAN COMPANY at 722 Marietta St., N.W., ATLANTA, GEORGIA, is the latest step in the company's extensive expansion program. Designed by Robert & Co. Assoc. and constructed by M. T. Lambert & Company, the building is completely air conditioned.

The history of the J. J. Finnigan Co. is one of steady growth and progress since 1888. It would be difficult to find many industries through the Southeast who have not had occasion to call upon J. J. Finnigan for at least one of the fabricated specialties they make. With the addition of modern alloys to the relatively old types of boiler plate for unfired pressure vessels, storage tanks, Finnigan now gives prospective customers in Arkansas, Louisiana, Florida, Georgia and neighboring states, a close and immediate source of heaters, cyclonic separators, breechings, hot water generators, pressure vessels, smokestacks, transformer tanks, and various types of plate fabrications.

Along with plans for expanded facilities of the home plant in Atlanta, a sales expansion program is also under way. A sales office of the J. J. Finnigan Company has recently been opened in Dallas, Texas. Other offices are in New York City, Little Rock, Arkansas; Jacksonville and Miami, Florida. Another sales office addition is planned for Houston, Texas.

Officers of the J. J. Finnigan Company are: MR. WILLIAM J. MCALPIN, president; MR. C. F. BREEN, vice-president; MR. L. I. CHAFIN, vice-president; MRS. MAE E. MCALPIN, secretary and treasurer.

New Foxboro Plant—Dallas

A new branch factory at 11710 East Northwest Highway, will double the DALLAS, TEXAS, facilities of THE FOXBORO COMPANY, manufacturer of industrial instruments for process measurement and control.

The new building provides 13,000 sq ft of space for increased manufacturing activities, service and repair, and centralized warehousing in addition to enlarged quarters for the sales office.

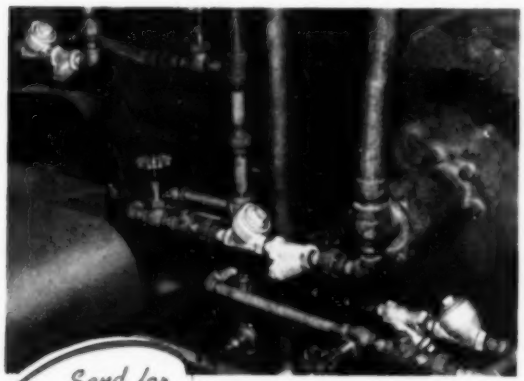
The new plant is of modern brick construction, designed on a single level for maximum efficiency. Its location, in an expanding industrial section of Dallas, facilitates rapid delivery and service to industries throughout the South and Southwest.

(*Continued on page* 139)

NICHOLSON TRAPS UP PRODUCTION at Certain-teed Plant

Above, Certain-teed Products Corporation's Dallas, Texas, roofing plant, where Nicholson steam traps have been adopted as standard.

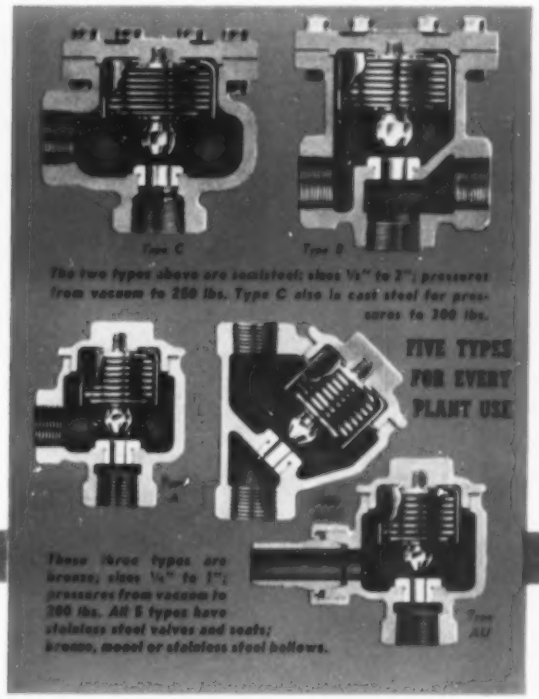
Why this modern Dallas, Tex., plant of Certain-teed Products Corporation has standardized on Nicholson steam traps may be important to you. It was because, as a plant official stated, "Nicholson traps have cut loss of steam and improved operations generally". More specifically, a recent survey showed these Nicholson features to be the reasons why leading plants are increasingly standardizing on Nicholson thermostatic traps: (1) Two to six times average drainage capacity. (2) Operate at lower temperature differential. (3) No air binding. (4) Freeze-proof. (5) Only one moving part. (6) No need to change valves for varying pressures. (7) Record low for steam waste. Types for every process, power and heat application.



Send for **CATALOG 953**

Contains installation diagrams and data for determining proper size of trap.

Nicholson traps on drying drums of asphalt saturator; Certain-teed's Dallas, Tex., plant.


Type C
Type B
The two types above are semisteel; sizes ½" to 2"; pressures from vacuum to 250 lbs. Type C also in cast steel for pressures to 300 lbs.
FIVE TYPES FOR EVERY PLANT USE
Type A
Type AU
These three types are bronze; sizes ½" to 1"; pressures from vacuum to 200 lbs. All 5 types have stainless steel valves and seats; bronze, monel or stainless steel bellows.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

175 OREGON ST., WILKES-BARRE, PA.

Sales and Engineering Offices in 58 Principal Cities

WHERE TO GET IT *And How to Do It*

–INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE–

Cooperating with leading manufacturers of equipment and supplies, SPI makes available for the asking without cost or obligation, the following valuable bulletins, booklets, handbooks and catalogs.

Check the list, fill in Coupon, mail to SOUTHERN POWER & INDUSTRY. (Coupon Post Cards on pages 17 and 18.) This service restricted to those interested in the operation or design of Industrial, Power and Service Plants.

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

1 **STACKS, FANS, DUST COLLECTORS FOR POWER AND INDUSTRIAL PLANTS**—Catalog 200—Application data and illustrative views of Thermix fan-stacks, fans, tubular and duplex dust and soot collectors, multiclones, and recirculators for flue gas control.—PRAT-DANIEL CORPORATION & THERMIX ENGINEERING COMPANY.

25 **DOUBLE-PASS BOILERS**—Bulletin 153—Gives complete specifications of a new double pass all-purpose industrial and heating boiler, "Southern made for Southern trade." Sizes from 44 to 153 hp S.B.I. with pressure up to 150 lb, designed for coal, gas or oil firing. This is a complete package double-pass unit, recently added to a regular line of single-pass firebox boilers manufactured since 1918.—LUCEY BOILER & MANUFACTURING CORP.

44 **CHIMNEYS — INDUSTRIAL AND INSTITUTIONAL**—Brochure—Outlines services available for the construction, design and maintenance of all types of industrial and institutional chimneys.—INTERNATIONAL CHIMNEY CORP.

48 **BOILER TUBES**—Booklet, available upon request, gives details concerning weights and other data of tubing and pipe, their working pressure scales, and the bending operations used in forming. Useful charts and engineering information.—BOILER TUBE CO. OF AMERICA.

54 **OIL & GAS BURNER EQUIPMENT**—Bulletin OB-53, 28 pages—Covers industrial, oil and gas burner equipment, burners, registers, pumping and heating systems. Illustrated with equipment and plant equipment photographs. Engineering tables.—THE ENGINEER CO.

57 **ASPHALT HEATERS**—Bulletin—Describes combustion chamber, tubular heat exchanger and related auxiliaries of Todd thermo-convective asphalt heaters. Shows how this automatic, low maintenance, highly efficient unit is designed to heat asphalt economically, and with "close control."—TODD SHIPYARDS CORP. (Combustion Equipment Division).

61 **ASH CONVEYORS**—Catalog, 8 pages—Guide in selection of steam pneumatic ash conveyor systems—description and illustration of special rotary feeders, cut-off valves, furnace doors—information on crushing, conveying and storing of ash, also of metal turnings and reclaimed oil for metal working plants.—NATIONAL CONVEYORS CO. INC.

62 **STOKERS FOR REFUSE OR COAL**—Catalog 565, 24 pages—Describes and illustrates the Roto-Stoker, stationary grate and dumping grate type, both manual and power, for the burning of refuse or coal, or a combination of the two—typical application photographs and engineering data.—DETROIT STOKER CO.

63 **PNEU-BLAST SOOT BLOWING**—Bulletin 1915, 4 pages—Describes Vulcan Pneu-Blast, or intermittent-air, soot blowing system. Illustrated with operating diagrams and installation photographs.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

66 **REFRACTORY PRODUCTS**—Guide, 48 pages—Describes various applications and materials used in monolithic refractory enclosures for all types of boiler settings. Describes particularly Plibrico refractory products and Plibrico construction methods, including such features as sectionally-supported air cooled walls, Multi-Rib steel casings, and other unique features of design.—PLIBRICO COMPANY.

84 **PACKAGED BOILERS**—Booklet No. 102—Explains how the Continental boiler equals or betters the economy and efficiency of other packaged boilers now available. Actual test reports are available to confirm statements made.—BOILER ENGINEERING & SUPPLY COMPANY, INC.

86 **PULVERIZED FUEL SYSTEMS**—Bulletin, 29 pages—Gives information based on 50 years' experience in steam generation; well illustrated with cross-sectional drawings and graphs—gives advantages, typical installations, and descriptions of major operating parts.—FOSTER WHEELER CORP.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

104 **HEAT EXCHANGERS**—Bulletin FF-FD-6.001, 12 pages—Describes Fin-Fan heat exchangers, air cooled units designed for a wide variety of industrial cooling and condensing applications—to replace or augment water-cooled heat exchangers.—THE FLUOR CORPORATION.

110 **ATOMIZING DEAERATOR**—Publication 4160—Describes completely the 900,000 lb/hr Cochrane atomizing deaerator as applied in a leading oil refinery power plant—and the possibilities of this heater unit elsewhere.—COCHRANE CORP.

145 **INJECTORS**—Bulletin describes Wizard condenser injectors, intended for positive protection against untimely condenser shut-downs in marine or stationary plants. The emergency use of such injectors does not affect the operation of the condenser, and is absolutely harmless to metal and packing.—CONDENSER SERVICE & ENGINEERING CO. INC.

155 **PROPORTIONING PUMPS**—Bulletin 52—Contains data on chemical feed packaged units made up of sturdy steel storage tank and high pressure low capacity proportioning pump—application and specification data.—THE BIRD-ARCHER COMPANY.

167 **ROTARY PUMPS**—Bulletin 307—Describes the features and advantages, and outlines the engineering details of Blackmer rotary pumps. These have been manufactured since 1904 and incorporate the outstanding advantages of "automatic adjustment for wear," and economical replacement of parts.—BLACKMER PUMP CO.

190 **CENTRIFUGAL PUMPS**—Bulletin 1 gives a condensed listing of all types of centrifugal pumps for every service, including capacity, pressure and head range for each type. A quick reference on centrifugal pumps from A to Z.—PACIFIC PUMPS, INC.

191 **SCREW PUMPS**—Bulletin S-204, 18 pages—Describes and illustrates Warren Quimby screw type rotary pumps, giving sectional and exterior views, installation pictures, dimensions, engineering data, selection charts, etc.—WARREN STEAM PUMP CO. INC.

INSTRUMENTS—METERS CONTROLS—REGULATORS

220 **DIAL THERMOMETERS**—Bulletin 255 describes a complete line of easy-to-read, vapor-pressure-actuated dial thermometers, available with rigid stem for use in pipe lines and tanks, or with flexible tubing for conveniently determining temperature at a point some distance from dial.—THE POWERS REGULATOR CO.

222 **PRESSURE REGULATORS**—Catalog 76—Gives complete detailed information covering applications, operation and specifications of Reducing Valves, Pump Pressure Regulators and Back-Pressure Regulators. Included is a simple, practical method for selecting size of regulators.—MASON-NEILAN REGULATOR CO.

226 **PRESSURE GAUGES**—Ashcroft Gauge Catalog, 124 pages—Information on pressure gauges, gauge accessories and gauge engineering, sectionalized by product lines, fully indexed, with selector tables for all gauges. Illustrated with photographs and line drawings.—MANNING, MAXWELL & MOORE, INC.

228 **GAGE ILLUMINATOR**—Supplement ML—Describes a high power mercury lamp in special housing to fit back of water gage inserts, to increase visibility of water level reading.—RELIANCE GAUGE COLUMN CO.

249 **WATER COLUMNS**—Unit 232—Describes, illustrates and gives specifications on Jerguson water columns. Principle of operation and features to assure positive alarm signals if boiler water falls too low or rises too high, are explained.—JERGUSON GAGE & VALVE CO.

259 **CONTROL VALVES**—Catalog 552 describes a complete line of two, three, four-way, multi-port, metering, distributing and special type valves. Lever, foot, solenoid and motor types for all mediums, with pressures up to 5000 lb.—W. H. NICHOLSON & CO.

281 **THREE-INFLUENCE FEED CONTROL**—Bulletin 1013-A—Describes Copes Type 3-L instrument-type feedwater control. Feed is modulated by three influences—steam flow, feedwater flow and drum water level. Miniature or standard recorders may be used or eliminated as desired.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

284 **PRESSURE CONTROLLERS**—Wizard Bulletin D-3—Describes the ingenious simple mechanism of Wizard controllers used to produce accuracy and dependability in pressure control.—Bourdon tube for high pressure, bellows for low pressure.—FISHER GOVERNOR CO.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

314 **CONVEYING AND DUST COLLECTORS**—Bulletin 10-H-53—Describes the Montgomery "Blow-Rite" system for pneumatic conveying and for dust collecting—intended to handle the most difficult type of job.—JACKSONVILLE BLOW-PIPE COMPANY.

315 **TANKS OF STEEL AND ALLOYS**—Catalog 102-P&RS—All types of tanks for hot water storage, bulk liquid storage, oil or chemical storage, and other unfired pressure vessel use.—J. J. FINNIGAN CO.

326 **GRATING—FLOORING**—Catalog, 12 pages—Gives picture story of "Weldforged" steel grating, flooring and stair treads—continuous spiral cross bars, alternating right and left, and slightly above bearing bars, electronically weldforged into inseparable units to insure greater non-skid protection and durability.—KERRIGAN IRON WORKS, INC.

331 **HYDRAULIC CYLINDER**—Bulletin 701, 28 pages—Describes a complete line of hydraulic cylinders and gives diagrams, photographs, charts and engineering data in explanation of the different types, with capacities up to 1500 psi steam and 3000 psi water working pressures.—LINDBERG ENGINEERING COMPANY.

332 **CUTTING TOOLS**—New "Action Catalog"—Gives complete information to superintendents, engineers, foremen, and operating executives as to possible savings through use of Porter cutters which save hours of labor, reduce shut-off time, solve emergency problems.—H. K. PORTER CO.

360 **STEAM ACCUMULATORS**—Bulletin RA-52-8—Describes well known steam accumulators to balance steam supply and steam demand in intermittent processes such as are found in brewing, food processing, refining, paper and textile plants.—FOSTER WHEELER CORP.

365 **ELECTRONIC TELEPHONES**—Bulletin GP-8—Describes the GAI-Phone, which makes communication possible in extremely noisy areas without aid of acoustic booth—wall mount and desk type models now available.—GAI-TRONICS CORPORATION.

388 **BENDING WROUGHT IRON**—"The Bending of Wrought Iron Plates"—A service manual on the principles and practices used in fabricating wrought iron pipe and other items made from wrought iron plate. Tables and recommended cold and hot bending diameters. How to specify wrought iron plates.—A. M. BYERS CO.

390 **CASINGS AND PANELBOARD**—Booklet F3, 37 pages—Depicts plant and equipment for producing breechings, casings, panel boards and other items of steel fabrication up to ¼" thickness. Profusely illustrated with representative photographs of products.—THE KIRK & BLUM MANUFACTURING COMPANY.

394 **ASH CONVEYORS**—Catalog, 8 pages—Guide in selection of steam pneumatic ash conveyor systems—description and illustration of special rotary feeders, cut-off valves, furnace doors—information on crushing, conveying and storing of ash—adaptable to metal turnings and oil recovery in metalworking plants.—NATIONAL CONVEYORS CO. INC.

396 **INCINERATORS**—Bulletin, 16 pages—Describes a series of incinerators with type and size for virtually every plant or institution, and for every industrial application.—PLIBRICO COMPANY.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

403 **VALVE OPERATORS, SPROCKET RIMS**—Bulletin SB—Describes and illustrates adjustable sprocket rims with chain guides, and other forms of Babbitt valve operators and controls.—BABBITT STEAM SPECIALTY CO.

424 **WROUGHT IRON NIPPLES**—Bulletin 20M-H-53, 4 pages—Gives identification and engineering details, such as size and service, of wrought iron nipples. Tables of sizes and lengths of both standard weight and extra strong styles.—A. M. BYERS COMPANY.

431 **STEAM TRAPS FOR GREENHOUSES**—Bulletin No. 382, 8 pages—Tells how and why of unit trap heating coils. Tells how to figure radiation required for greenhouses, lists trap styles and prices.—ARMSTRONG MACHINE WORKS.

436 **WATER GAGE TELEVISION**—Bulletin WG-1813—Illustrates and describes equipment for televising boiler water level gages, including TV camera, illuminator, monitor and all necessary linkage, as well as auxiliary viewing monitors.—YARNALL-WARING COMPANY.

441 **ALUMINUM PIPE JACKETING**—Folder—Describes aluminum weather-proof jacketing for the protection of outdoor insulated pipe lines, towers, tanks and vessels. Complete information, price list and samples of this cost-cutting product available on request.—CHILDERS MANUFACTURING CO.

461 **PRESSURE REDUCING VALVE**—Bulletin 477-A, 12 pages—Factual data with sectional views to illustrate each type. Valve ports are individually engineered for each installation to meet a higher standard of accuracy and dependability than offered by stock units.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

465 **STEAM-JACKETED VALVES**—Bulletin E-200—Describes the design, operation and special arrangement of steam jackets for handling viscous materials such as heavy petroleum, coal tar and chemical products, which congeal or harden under operating conditions. Illustrated, with engineering data.—EVERLASTING VALVE CO.

478 **CONTROL VALVES**—Catalog 552, 16 pages—Describes Nicholson control valves for air, gas, oils, steam or water—Pressures up to 500 lb—lever operated, solenoid operated, or motor operated—in many convenient types and sizes.—W. H. NICHOLSON & CO.

482 **CAST IRON STEEL VALVE BODIES**—Bulletin R-1—Describes "D" and "DA" cast steel 3000 lb and 6000 lb cast steel angle and globe pattern, single seated valve bodies with venturi type seat rings.—FISHER GOVERNOR CO.

493 **UNIONS AND CHECK VALVES**—New Catalog—Shows complete line of Perfect Seal forged steel unions and swing check valves, complete with sizes, pressures, and engineering data.—CATAWISSA VALVE & FITTINGS COMPANY.

MAINTENANCE PACKING GASKETS, LUBRICATION

505 **VACUUM CLEANING SOLVES DUST PROBLEMS**—Booklet—Describes how Hoffman vacuum cleaning handles dust problems, wiping out dangerous, "derelict dust," providing quick, convenient and thorough clean-up of floors, walls, etc.—U S. HOFFMAN MACHINERY CORP.

513 **POWER PLANT CLEANING DIGEST**—18 page illustrated manual describes simplified methods of performing more than seventy cleaning, descaling and related operations and problems.—OAKITE PRODUCTS, INC.

517 **TUBE INSERTS**—Bulletin, 8 pages—Describes the design, application and accomplishments of metal inserts or wearing strips for the inlet ends of tubes in condensers, heat exchangers, etc.—CONDENSER SERVICE & ENGINEERING CO., INC.

562 **SCALE REMOVAL**—Bulletin 154-12M—Discusses the removal of scale from water and gas lines through the use of liquid chemical solvents; gives typical problems and methods of solution; and lists various applications in gas mains, cooling water piping systems, feedwater lines, salt water lines, sewer lines, etc.—DOWELL, INC.

ENGINES, DRIVES POWER TRANSMISSION MATERIAL HANDLING

610 **UNIVERSAL JOINTS**—Bulletin CS-16, 8 pages—Describes bevel gear universal joints designed to give positive transmission of torsion regardless of shaft angle—from 0° to 135° on vertical center lines, from 0° to 360° on horizontal center lines.—CONDENSER SERVICE & ENGINEERING CO., INC.

615 **VARIABLE SPEED TRANSMISSION**—Form 700, 32 pages—Describes variable speed pulleys, "Selecto Speed Transmissions," V-belt transmissions with representative applications, engineering data, etc.—LOVEJOY FLEXIBLE COUPLING CO.

616 **BEARINGS & BUSHINGS**—Catalog No. 53—Gives a complete listing of all stock sizes, patterns and styles of fully machined bronze bearings, bronze bars, and electric motor bearings.—THE BUNTING BRASS & BRONZE CO.

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 582, SEC. 34.9, P. L. & R., ATLANTA, GA.

Equipment and Review Editor
SOUTHERN POWER AND INDUSTRY
806 Peachtree St., N. E.
Atlanta 5, Ga.

5-54-1

Please send me without obligation, free booklets described in the May, 1954, issue of SOUTHERN POWER AND INDUSTRY as circled below.

1	25	44	48	54	57	61	62	63	66	84	86	104	110	145	155	157
190	191	220	222	226	228	249	259	281	284	314	315	326	331	332	360	365
388	390	394	396	403	424	431	436	441	461	465	478	482	493	505	513	517
562	610	615	616	621	628	643	657	706	738	778	787	803	804	807	826	838
895	901	916	924	960	979	984	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9	Q-10
Q-11	Q-12	Q-13	Q-14	Q-15	Q-16	Q-17	Q-18	Q-19	Q-20	Q-21	Q-22	Q-23	Q-24	Q-25	Q-26	Q-27

Also send further information on following New Equipment (page 126)

E-1 E-2 E-3 E-4 E-5 E-6 E-7 E-8 E-9 E-10 E-11 E-12 E-13 E-14 E-15 E-16 E-17 E-18 E-19 E-20 E-21 E-22 E-23 E-24

Name ..... Position .....

Company Name .....

Street .....

City ..... Zone ..... State .....

621 **POWER TRANSMISSION AND EQUIPMENT** — Catalog 40 — Gives comprehensive details of a complete line of power transmission including V-Belt drives, flat belt drives, pulleys, gears, chains, sprockets.—Industrial Division of CONTINENTAL GIN CO.

628 **BELT CUTTER**—Bulletin BC-350—The cutting of all widths and thicknesses of belts—and a special tool which gives perfect results.—FLEXIBLE STEEL LACING CO.

643 **AUTOMATIC MONORAIL TRANSPORTATION**—Bulletin AD-1A, 12 pages—Describes a complete range of automatic dispatch monorail systems for transfer of materials by remote control.—AMERICAN MONORAIL CO.

657 **MATERIALS HANDLING**—Catalog T-54, 34 pages — Gives structural details, specifications, engineering data, photographs on over fifty models of Fairbanks two-wheel and platform trucks, including hand trucks, steel framed platform trucks, lift jack platform trucks, wagon trucks and dollies.—THE FAIRBANKS CO.

WATER TREATMENT HEATING, VENTILATING, AIR CONDITIONING, REFRIGERATION, DUST & FUME CONTROL

706 **BOILER FEEDWATER TREATMENT**—Bulletin 63, 8 pages—The Treatment of Low Hardness Boiler Feedwater—Explains the Nalco system of water treatment as applied to plants having low makeup, or naturally soft, pre-softened, or evaporated boiler feedwater. Stabilization, sludge conditioning, steam conditioning and metal protection are objectives discussed.—NATIONAL ALUMINATE CORP.

738 **ZEOLITE WATER SOFTENERS**—Bulletin—Describes in detail the operation and application of Cochrane hydromatic single-control-valve Zeolite softeners which combine operations in a single unit for service, back-wash, brine and rinse, and two stand-by positions.—COCHRANE CORP.

778 **REFRIGERANT LIQUID SEALS**—Bulletin No. 241, 4 pages—Explains operation and selection of inverted bucket liquid seals to prevent gas entering evaporator. Inverted bucket expansion valve hookups also shown. Data, prices included.—ARMSTRONG MACHINE WORKS.

787 **ZEOLITE SOFTENERS** — Bulletin WC-168 — Describes zeolite water softeners of the sodium cycle and hydrogen cycle—softening water by ion-exchange—featuring modern design, economical operation, successful performance, and excellent service.—GRAVER WATER CONDITIONING CO.

ELECTRICAL

803 **LIGHTING STANDARDS**—Catalog 31F, complete with engineered data and illustrations—Shows "Weldforged" lighting standards for plant property, streets, highways, playgrounds, churches, housing projects, shopping centers, plants of all sorts—also mast arms and brackets.—KERRIGAN IRON WORKS, INC.

804 **CUBICLES, PANELS, ENCLOSURES**—Descriptive Booklet—"Contract Manufacturing in Sheet Metals"—Describes job-fitted control centers, bus enclosures, cubicles, switchgear housing and other sheet metal assemblies for utility and industrial plants.—THE KIRK & BLUM MFG. CO.

807 **ELECTRONICS COMMUNICATION SYSTEM** — Catalog — Describes a high and low level voice plant communication system—public address, operational intercommunication, amplified party-line telephone, all provided in one complete system.—GAI-TRONICS CORPORATION.

826 **MECHANICAL RECTIFIERS**—Bulletin 5205 — Offers an illustrated explanation of the unequalled conversion efficiency of the mechanical rectifier in heavy-duty industrial applications. The bulletin defines this efficiency, and explains through curves and tables how efficiencies of 95 to 96% and above are achieved in the 50-400 volt (d-c) range. — I-T-E CIRCUIT BREAKER COMPANY.

838 **ELECTRIC POWER DRIVES** — Scale Drawings, 33 sheets—Illustrate and describe geared, electric power drives for design engineers, draftsmen and layout engineers. Three views are detailed on each sheet with the frame and type drawn to three separate scales, from ½ hp to 30 hp capacity.—STERLING ELECTRIC MOTORS, INC.

895 **SIGNAL CABLES**—Catalog W-50-3 —Describes the construction, characteristics, tests and specifications of Laytex insulated cable for fire alarm, police signal, plant signal, supervisory control and other applications.—UNITED STATES RUBBER COMPANY.

MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

901 **CENTRIFUGAL BLOWERS AND EXHAUSTERS**—Bulletin A-650, 12 pages, describes the design features and the applications of Hoffman multi-stage centrifugal blowers. Capacity tables, work data and handy information included.—U. S. HOFFMAN MACHINERY CORP.

916 **INTEGRAL DUST COLLECTORS**—Catalog 310—Describes the Aerotec integral dust collector for application to grinding, buffing and cutting machinery operations, and similar applications where a comfort or health hazard is involved.—THE THERMIX ENGINEERING CO.

924 **BLEACHES** — Catalog 12-I-1 — Describes "Weldforged" steel bleachers to give inexpensive, permanent, easily erected units. Illustrates simple, fast and inexpensive erection, particularly applicable to plant recreation fields.—KERRIGAN IRON WORKS, INC.

960 **UNIT HEATERS**—Thermolier Catalog—Describes the important features of Thermolier unit heating, an economical method of adequate plant heating.—GRINNELL CO., INC.

979 **INDUSTRIAL PRODUCTS** — Catalog, 40 pages—Data on insulations, refractory products, asbestos cement pipe, packings, gaskets, electric products, friction materials, roofing, siding, flooring, partitions and ceiling for industrial and commercial plants.—JOHNS-MANVILLE.

984 **DUST RECOVERY** — Booklet, 32 pages — Outlines the theories and basic principles of centrifugal dust recovery, and the application of multi-clone units, with their advantages of adaptability, space saving, high efficiency and low maintenance.—WESTERN PRECIPITATION CORP.

Continued on page 158

5-54-2

Please send me without obligation, free booklets described in the May, 1954, issue of SOUTHERN POWER AND INDUSTRY as circled below.

1	25	44	48	54	57	61	62	63	66	84	86	104	110	145	155	167
190	191	220	222	226	228	249	259	281	284	314	315	326	331	332	360	365
388	390	394	396	403	424	431	436	441	461	465	478	482	493	505	513	517
562	610	615	616	621	628	643	657	706	738	778	787	803	804	807	826	838
895	901	916	924	960	979	984	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9	Q-10
Q-11	Q-12	Q-13	Q-14	Q-15	Q-16	Q-17	Q-18	Q-19	Q-20	Q-21	Q-22	Q-23	Q-24	Q-25	Q-26	Q-27

Also send further information on following New Equipment (page 126)

E-1 E-2 E-3 E-4 E-5 E-6 E-7 E-8 E-9 E-10 E-11 E-12 E-13 E-14 E-15 E-16 E-17 E-18 E-19 E-20 E-21 E-22 E-23 E-24

Name ..... Position .....

Company Name .....

Street .....

City ..... Zone ..... State .....

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 582, SEC. 34.9, P. L. & R., ATLANTA, GA.

Equipment and Review Editor
SOUTHERN POWER AND INDUSTRY
806 Peachtree St., N. E.
Atlanta 5, Ga.

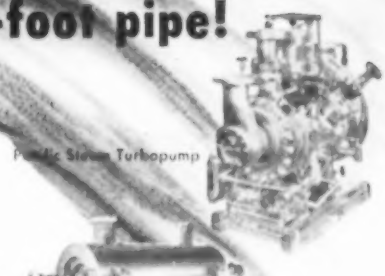
List Items You Want, Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

It takes a lot of water to fill a 7-foot pipe!

To bring the hot water to all the Pacific Boiler Feed Pumps placed in operation in 1953 would require a pipe 7 feet in diameter...

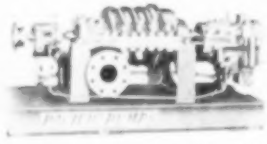
Today practically all of the large power generating companies throughout the United States have one or more Pacific Pumps in feed water service. Pacific Boiler Feed Pumps now operating include small vertical type units handling 47,700 pounds per hour at 710 psig discharge pressure—to very large horizontal type units handling 800,000 pounds per hour at 2430 psig discharge pressure. Bulletins 106, 109 and 118 giving details available on request.



Pacific Steam Turbopump

Pacific Type IBF

Pacific Type ABF



Pacific Type JBF

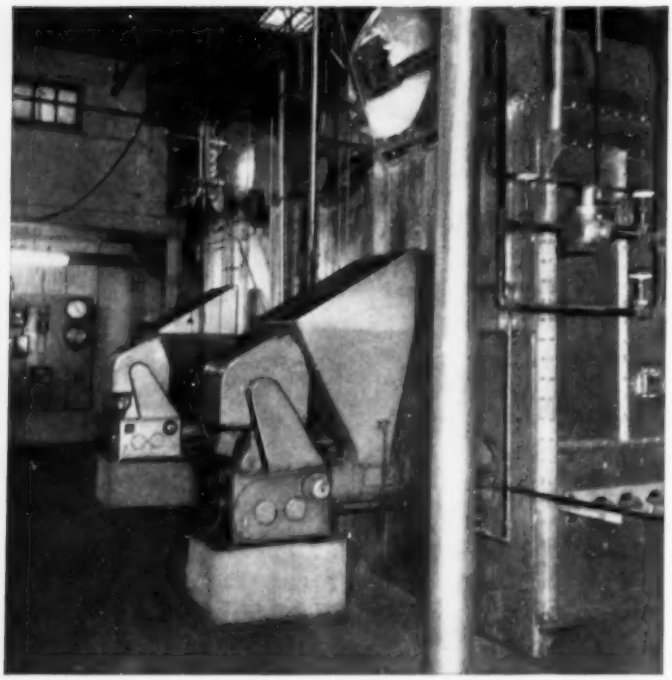
Specify **Pacific CENTRIFUGAL BOILER FEED PUMPS**

Pacific Pumps inc. HUNTINGTON PARK, CALIFORNIA
ONE OF THE DRESSER INDUSTRIES
Export office: Chanin Building, 122 East 42nd Street, New York
Offices in all principal cities

BF-19

"WE GET BIG SAVINGS BY BURNING COAL THE MODERN WAY!

Other fuels would cost us far more!"



says
Mr. A. J. Monta,
Plants Engineer,
The Welch Grape Juice Company, Inc.,
Westfield, New York

"We analyzed the cost of coal and other fuels before modernizing our power plant. The result is this up-to-date coal installation that delivers steam at half the cost of competing fuels. *For economy you can't beat* bituminous *coal burned the modern way!*"

Modern coal-burning and handling equipment saves this plant more than 35% on labor alone! New stokers, boilers, controls and coal-handling equipment cut labor costs and save this plant 18% on fuel. The complete installation will pay for itself in about 6 years.

● Burning bituminous coal the modern way can save you money, too! Labor costs are cut to a minimum with up-to-date coal- and ash-handling equipment... modern combustion installations deliver anywhere from 10 to 40% more power from every ton of coal!

That's why, if you're planning to modernize or build a new plant, it will pay you to get the latest facts on coal. Let a consulting engineer show you how a modern coal installation designed to meet your specific needs can save you real money.

Here's something more! Today's bituminous coal customers get a better-prepared product—designed to meet their special requirements. And bituminous coal offers future dependability no other fuel can match. Reserves are virtually inexhaustible, and America's coal industry is the world's most efficient —your assurance of dependable supply of coal at relatively stable prices for years to come.

If you operate a steam plant, you can't afford to ignore these facts!

COAL in most places is today's lowest-cost fuel.

COAL resources in America are adequate for all needs—*for hundreds of years to come.*

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association, Washington, D. C.

FOR HIGH EFFICIENCY ★ FOR LOW COST

YOU CAN COUNT ON COAL!

"Here's why I buy my CABLE ACCESSORIES where I buy my cable—at ANACONDA!

"It simplifies ordering. It concentrates responsibility. It speeds up shipments.

"And it assures me of cable accessories that are designed, engineered, made and tested by power-cable specialists."

Yes, it will pay you to check your needs against Anaconda's complete line, including:

POTHEADS

Parts are *fully interchangeable* for greater adaptability, faster delivery, easier installation and lower costs. Anaconda supplies both gasket and solder-sealed types . . . your stock problem is simplified, too!

JOINTING KIT

Your cable-installation crews have everything they need for a specific joint. All the materials you need are always on the spot—never forgotten . . . never left behind—assures neat, lasting job.

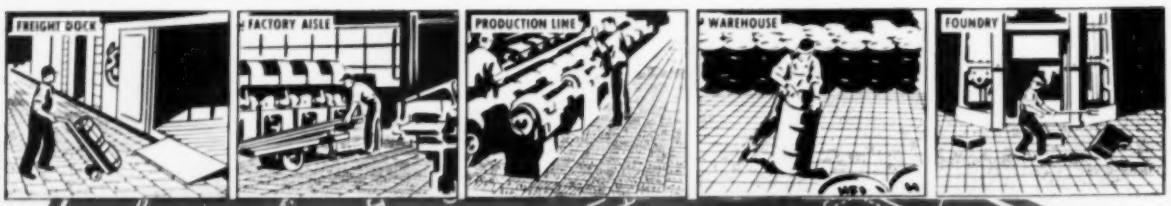
F-3* LEAD-ALLOY JOINT SLEEVE

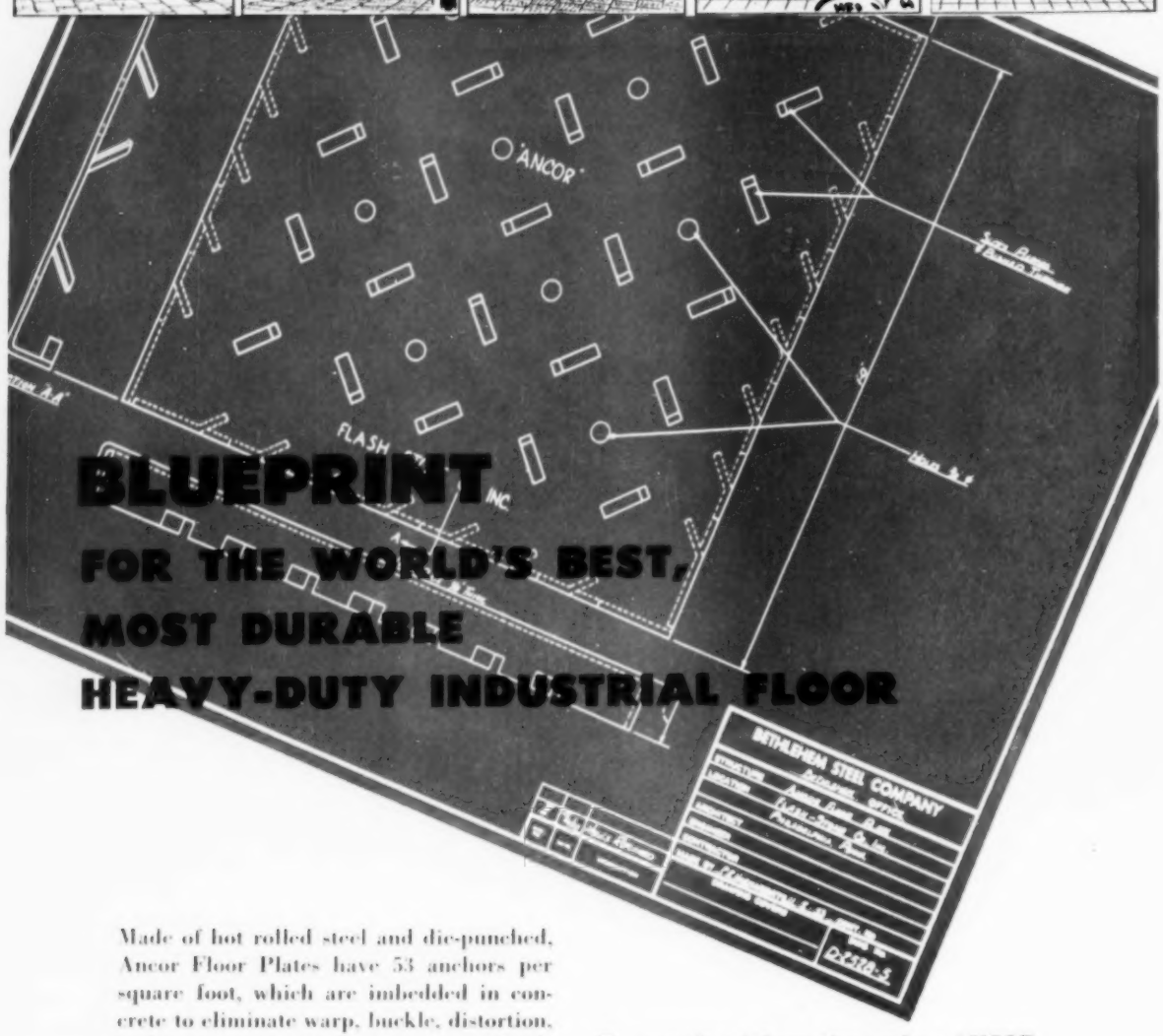
F-3 has higher tensile strength, lower creep rate, greater bursting strength, and higher resistance to bending fatigue and vibration. Specify F-3 Lead Sleeve and be sure. *Reg. U. S. Pat. Off. 54047

Write for free Cable Accessories Catalog to *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

ANACONDA®

where cable accessories are made by cable experts





BLUEPRINT FOR THE WORLD'S BEST, MOST DURABLE HEAVY-DUTY INDUSTRIAL FLOOR

Made of hot rolled steel and die-punched, Ancor Floor Plates have 53 anchors per square foot, which are imbedded in concrete to eliminate warp, buckle, distortion, and unevenness. And 33 concrete islands per square foot provide a smooth, safe, quiet, skid-proof surface.

For complete information on how ANCOR FLOOR PLATES can solve flooring problems for you, mail coupon today.

Flash-Stone Company, Inc.
3723 Pulaski Avenue
Philadelphia 40, Pa.

Please send my free copy of the new booklet describing ANCOR Rolled Steel Floor Plates:

Name _____

Title _____

Company _____

Address _____

City _____ *Zone* ____ *State* _____

ANCOR
ROLLED STEEL
FLOOR PLATES

Design and engineering are an integral part of every Horton® steel form built. Attention to details and practical arrangements of hinges, ratchets, jacks, access doors . . . allow quick setting, accurate alignment and easy stripping.

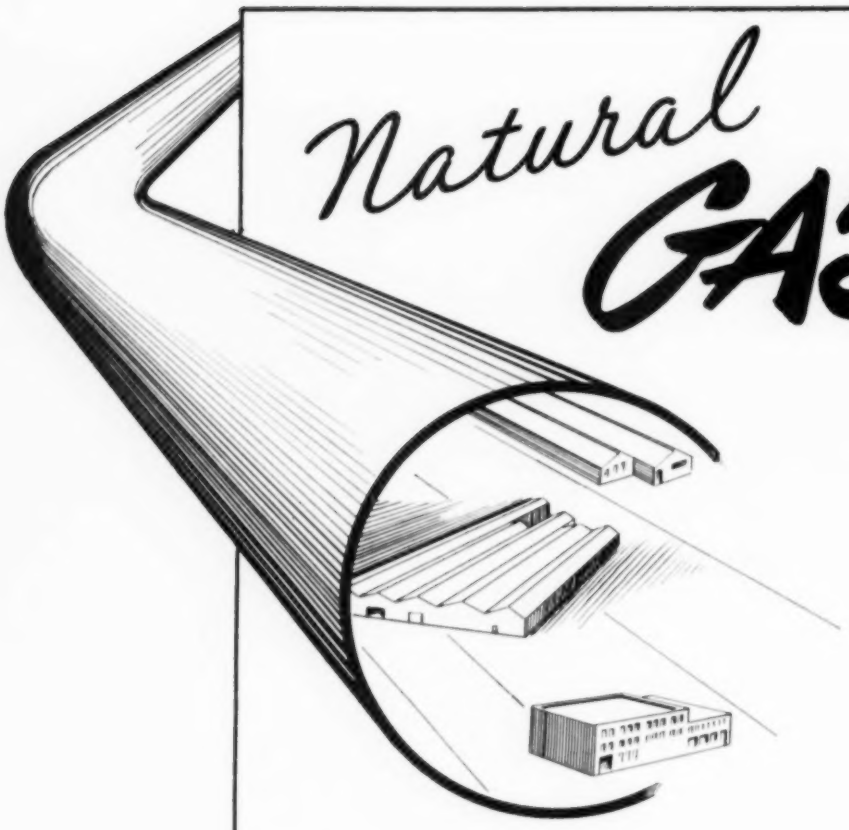
Consult our experienced engineers the next time you plan tunnel forms. Bring your problems to our nearest office . . . let us design forms engineered to fit the job!

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2180 Healey Bldg.	Detroit 26.....1524 Lafayette Bldg.	Pittsburgh 19.....3252 Alcoa Bldg.
Birmingham 1.....1531 North Fiftieth St.	Houston 2.....2132 C & I Life Bldg.	San Francisco 4.....1531—200 Bush St.
Boston 10.....1044—201 Devonshire St.	Los Angeles 17....1545 General Petroleum Bldg.	Salt Lake City 4.....545 W. 17th South St.
Chicago 4.....2107 McCormick Bldg.	New York 6.....3312—165 Broadway Bldg.	Seattle 1.....1345 Henry Bldg.
Cleveland 15.....2218 Midland Bldg.	Philadelphia 3....1646—1700 Walnut St. Bldg.	Tulsa 3.....1628 Hunt Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, *and* GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

Natural GAS



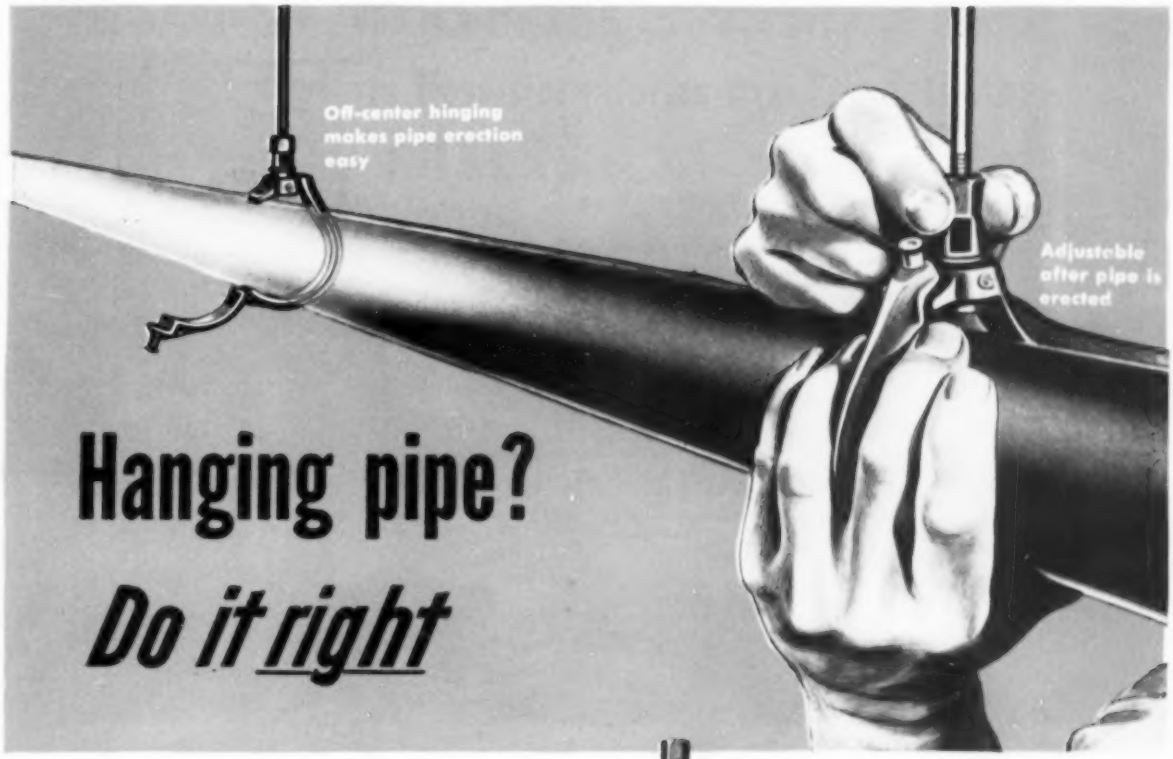
A Partner in the Progress of Southern Industry

In the rapidly advancing South, industry finds Natural Gas both an ideal fuel and a valuable raw material. In this dual role, Natural Gas contributes in no small measure to the dramatic progress of this section.

As a partner in the growth of Southern industry, Southern Natural has invested more than $188,000,000 in pipe lines and other facilities. As impressive as this record-breaking program proved to be, an additional $5,500,000 capital investment is planned for 1954.

SOUTHERN NATURAL GAS COMPANY

Watts Building — Birmingham, Ala.



Hanging pipe?

Do it right

There's a stock Grinnell hanger for every piping requirement

SAVE MONEY ON ASSEMBLY. Cut installation time, get better, stronger installations, with Grinnell adjustable pipe hangers and supports.

NO SAG . . . NO WATER TRAP. Grinnell hangers permit adjustment after pipe is installed. This makes it possible to prevent sagging pipe and water traps, and assures positive drainage for the entire system.

FOR EVERY INSTALLATION. There is a stock Grinnell hanger for every need from simple water pipe to high pressure, high temperature steam line. Where necessary, there is a hanger to compensate for thermal movement.

PLAY SAFE. Don't waste time or take chances on inadequate pipe hangers and supports. All Grinnell hangers comply with rigid piping code requirements.

Enlarged section showing locking feature

GRINNELL ADJUSTABLE SWIVEL PIPE RING
(Split Ring Type)

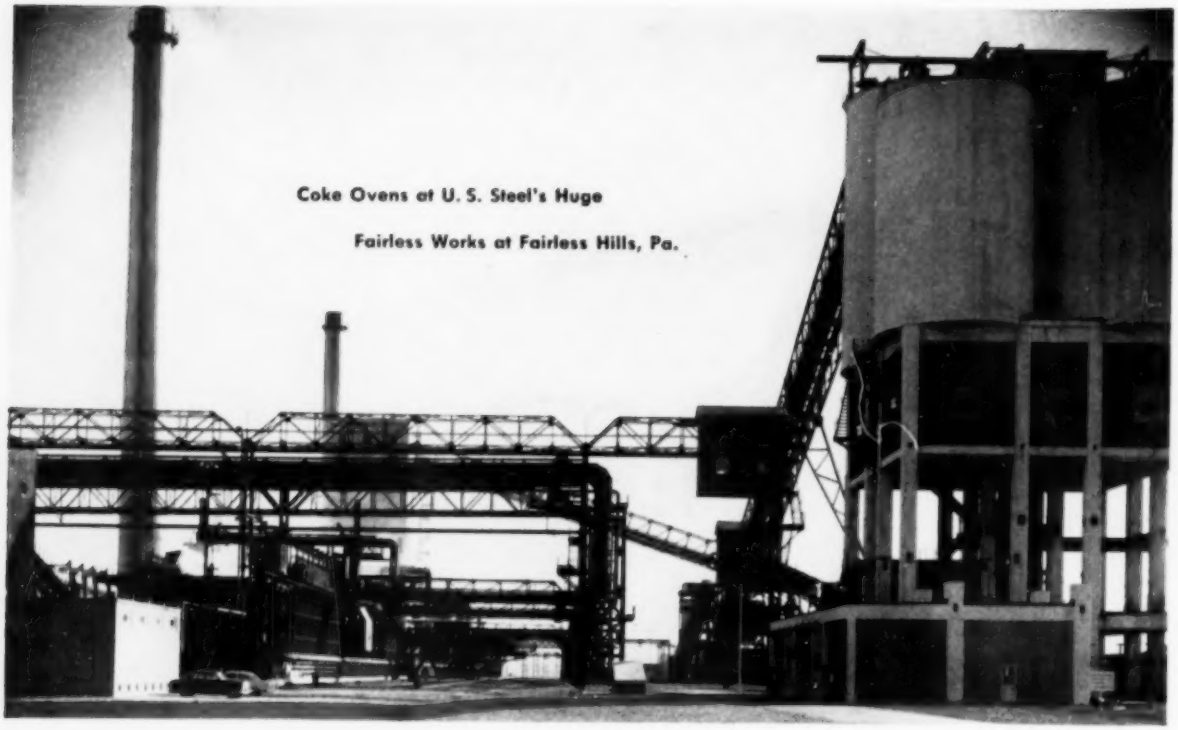
- Hinging of ring is off-center. This provides sufficient seating to hold pipe before closing ring. Wedge-type pin is loosely but inseparably cast into the hinged section for fastening after pipe is in place.
- To obtain proper adjustment, swivel shank can be turned easily by hand when the weight of the pipe is temporarily taken off the ring.
- When weight is returned, patented swivel shank locks automatically, preventing change of adjustment due to vibration. Wire retaining ring keeps swivel shank and pipe ring or yoke from separating, makes assembly a single unit.
- 12 sizes have load range of 80 lbs. for ¼" size to 1510 lbs. for 8" size. May be used in connection with practically any building attachment.

GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

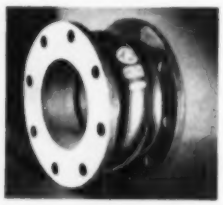
Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports
Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems



Coke Ovens at U. S. Steel's Huge Fairless Works at Fairless Hills, Pa.

Many proven Garlock products selected for U. S. Steel's Fairless Works

Garlock CHEVRON* Packing used on roll balance cylinders of hot and cold mills



Spool-type Rubber Expansion Joint used on industrial waste lines

Garlock LATTICE BRAID* Packing used for many general applications

Model 64 KLOZURE* Oil Seal used on hot and cold rolling mills

We are indeed proud that U. S. Steel chose Garlock packings, gaskets, mechanical seals, oil seals, and expansion joints for so many important installations in their great new plant. It is a real tribute to the reputation Garlock products have earned for long, trouble-free service under the toughest service conditions.

Let us show you how Garlock can help you to reduce downtime and cut maintenance costs. Just contact the Garlock representative in the sales office nearest you.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo Chicago • Cincinnati • Cleveland • Denver • Detroit • Houston • Los Angeles New Orleans • New York City • Palmyra (N. Y.) • Philadelphia • Pittsburgh Portland (Oregon) • Salt Lake City • San Francisco • St. Louis • Seattle Spokane • Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

*Registered Trademark

GARLOCK

PACKINGS, GASKETS, OIL SEALS, MECHANICAL SEALS, RUBBER EXPANSION JOINTS

226 SAFE SHOWERS in The University of Oklahoma

Boys and Girls New Dormitories Are Regulated by

POWERS MIXERS

Above: 4 of the 8 Modern Dormitories All Equipped with—

POWERS Double Safe *Thermostatic* WATER MIXERS

They make showers SAFE against scalding and sudden shots of cold or hot water caused by

PRESSURE *and* TEMPERATURE

fluctuations in water supply lines.

No Shower is Safe Without this Double Protection— Powers thermostatic water mixers *always* hold the shower temperature constant wherever the bather wants it. They are completely automatic. Failure of cold water instantly shuts off shower. Delivery temperature is *thermostatically* limited to 115° F.

Architects and Engineers
SOREY, HILL AND SOREY
Contractor
OLLER PLUMBING & HEATING CO.
All in Oklahoma City

•

Just ONE Shower ACCIDENT may cost many times more than POWERS mixers.

•

10 to 20% Water Saving. No need to get out of shower to readjust it because of fluctuating water temperatures . . . when controlled by a Powers Thermostatic Mixer.

For Utmost Comfort, Safety and Economy Install Powers Mixers • Write for Bulletin 365

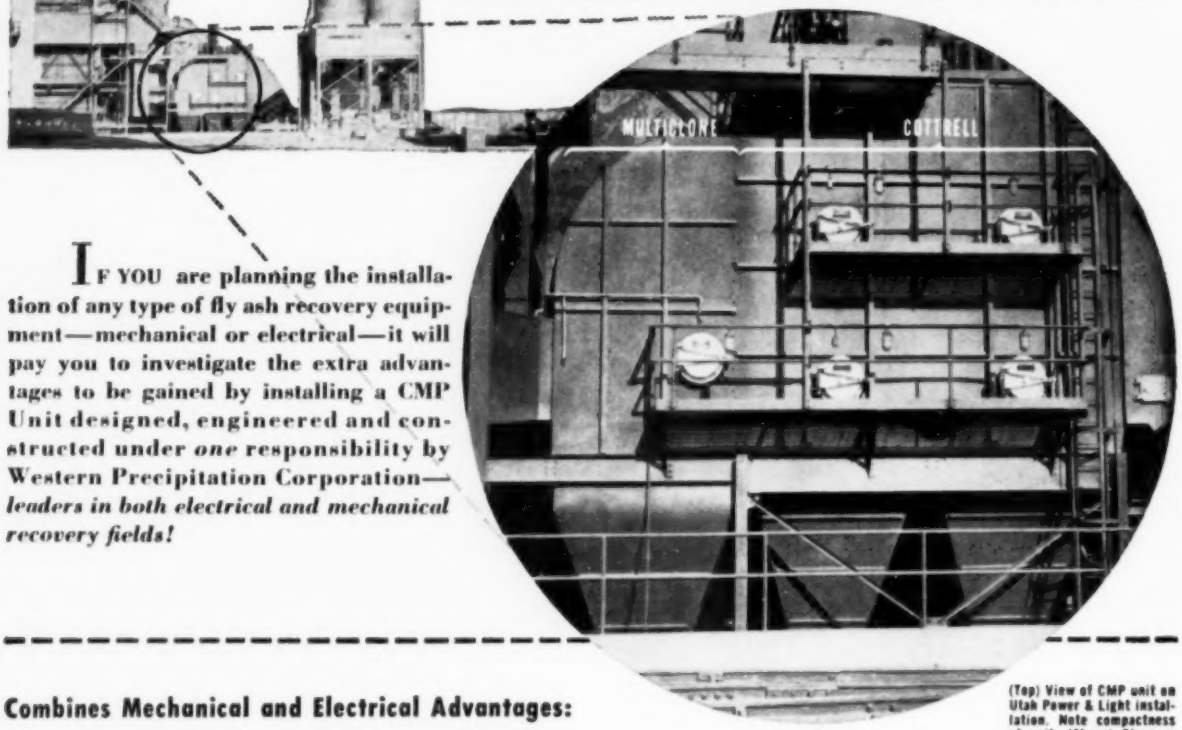
(b65)

Established in 1891 • THE POWERS REGULATOR COMPANY • SKOKIE, ILL. • Offices in Over 50 Cities

1333 Spring St., Atlanta, Ga.—101 N. Elm St., Greensboro, N. C.

Planning A Fly Ash Recovery Installation?

Consider these important advantages of a WESTERN PRECIPITATION CMP UNIT!



IF YOU are planning the installation of any type of fly ash recovery equipment—mechanical or electrical—it will pay you to investigate the extra advantages to be gained by installing a CMP Unit designed, engineered and constructed under *one* responsibility by Western Precipitation Corporation—*leaders in both electrical and mechanical recovery fields!*

(Top) View of CMP unit on Utah Power & Light installation. Note compactness of unit. (Above) Close-up of same installation.

Combines Mechanical and Electrical Advantages:

A CMP (Combination Multiclone-Cottrell Precipitator) Unit combines—in one compact installation—both mechanical and electrical recovery principles, so that maximum benefit is obtained from the advantages inherent in each method. The MULTICLONE section centrifugally cleans the gases of the larger and heavier fly ash particles (down to a few microns in diameter) . . . and the COTTRELL Precipitator then electrically removes the very small particles remaining in the gases. This combination arrangement has important advantages:

1. Using the MULTICLONE for cleaning out the heavier particles permits the bulk of the recovery operation to be performed with relatively low-cost equipment.

2. Using the COTTRELL for final clean-up insures unusually high recovery efficiency—approaching theoretically perfect, if desired—with a high efficiency, compact Precipitator unit.

3. Each type of unit—MULTICLONE and COTTRELL—can be arranged for its most efficient application. MULTICLONES may be connected to each separate boiler, if desired, and their draft requirement cut out when the boiler is down . . . while a central COTTRELL handles all gases and operates at higher efficiencies, with continued low power cost, when one or more boilers are down.

4. During soot-blowing periods, or while warming up cold boilers, the MULTICLONE efficiency usually increases, preventing overloads of detrimental carbon from reaching the COTTRELL.

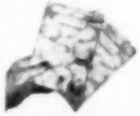
Only Western Precipitation Combines Multiclone and Cottrell "Know-How"—In ONE Organization!

A vital factor in obtaining maximum efficiency and economy in CMP installations is the proper balance of mechanical and electrical recovery equipment to the individual requirements of *each* application. Western Precipitation is unique in that it not only pioneered the commercial application of COTTRELL Electrical Precipitators over 43 years ago, but also has been a leader for many years in the *mechanical* recovery field with its widely-recognized MULTICLONE Collectors.

Result—Western Precipitation has the all-important "know-how" and experience in BOTH fields . . . knows from first-hand experience how to fit the *right* equipment in the *right* place, to do *your particular* job . . . and can provide the complete installation under ONE responsibility and ONE overall guarantee!

Let Our Experienced Engineers study your recovery requirements and make recommendations on the equipment best suited to your operations. A wire, phone call or letter to our nearest office places this unique "Know-How" at your service, without obligation!

Send for descriptive literature!



WESTERN Precipitation CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

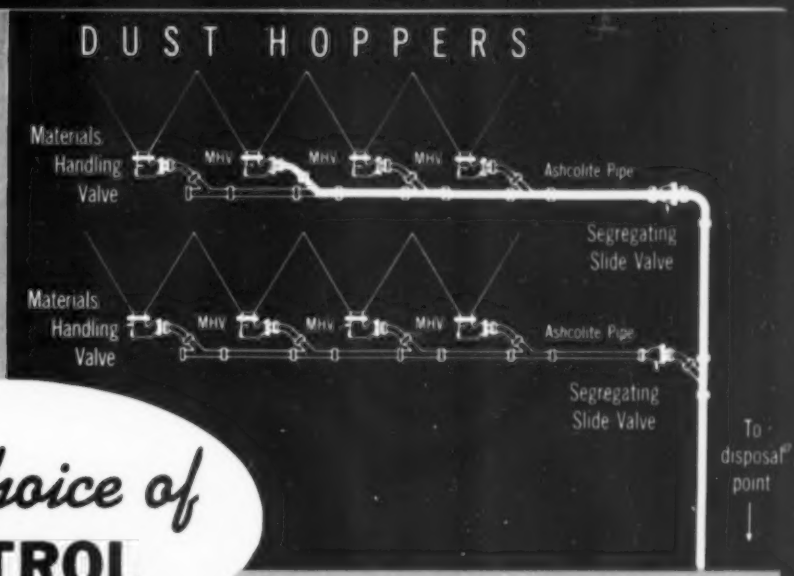
Main Offices 1052 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA

CHRYSLER BLDG., NEW YORK 17 • 1 N. La SALLE ST. BLDG., CHICAGO 2

1429 PEACHTREE ST. N.E., ATLANTA 5 • HOBART BLDG., SAN FRANCISCO 4

PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

DUST HANDLING

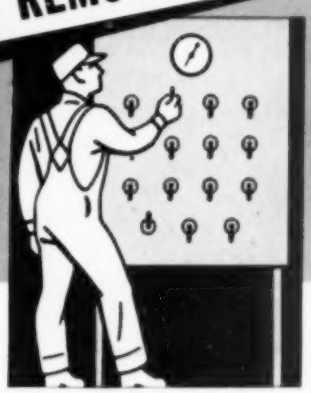


Your choice of CONTROL

MANUAL

Up and down stairs to observe and operate the valves by hand.

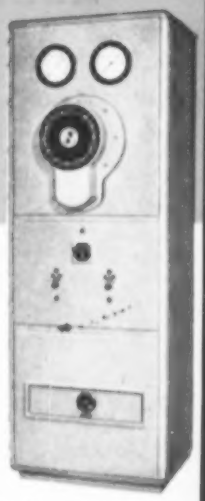
REMOTE MANUAL



By keeping an eye on a vacuum gauge to know when a hopper has been emptied, one man at a central control panel can shift entrainment to another hopper.

AUTOMATIC

Turn a master switch and forget it! Being subject to vacuum changes, the A-S-H Automatic Sequence Head electrically closes the Materials Handling Valve as soon as its hopper is emptied, and immediately opens the next valve in the series—and, in proper turn, the Segregating Valves. This "brain" pays for itself by saving labor and minimizing abrasive wear.



The Automatic Sequence Head is completely wired, tested and ready for use when shipped.

Which control method is best for your plant? You have to weigh immediate against long-range costs and savings. Let the records of A-S-H installations and our experience help you.

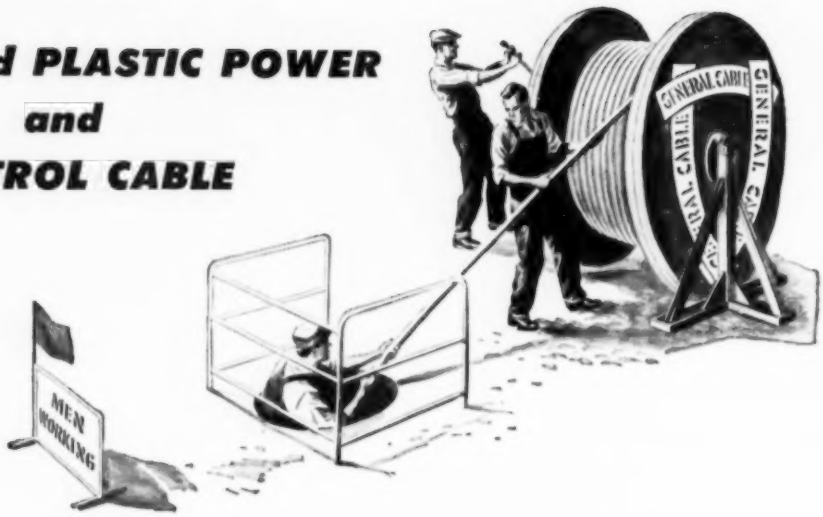
THE ALLEN-SHERMAN-HOFF CO. Dept. L—259 E. Lancaster Ave., Wynnewood, Pa.
Offices and Representatives in Principal Cities

HYDROJET (hydraulic) HYDROVAC (pneumatic)

materials handling systems

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

RUBBER and PLASTIC POWER and CONTROL CABLE



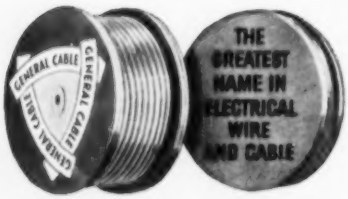
Besides offering the most complete line, General Cable makes top notch engineering service and useful product information easily available.

Rubber and Plastic Power and Control Cables are designed for power transmission, distribution and control...for duct and conduit installation...for direct earth burial...for submarine and aerial use (self supporting types are available).

Rubber or GENCORONE (corona resistant) oil base compound or plastic insulated...with braided, leaded, interlocked or submarine armored finish.

These popular and versatile lines of products are made to meet practically every operating condition. Get the full facts before you buy. Let our engineers help solve your wire and cable problems.

Every type for every use!



BARE, WEATHERPROOF, INSULATED WIRES and CABLES FOR EVERY ELECTRICAL PURPOSE

GENERAL CABLE CORPORATION

420 Lexington Avenue, New York 17, New York • Sales Offices: Atlanta • Buffalo Cambridge (Mass.) • Chicago • Cleveland • Dallas • Detroit • Greensboro (N. C.) • Houston Indianapolis • Kansas City • Los Angeles • Milwaukee • Minneapolis • New York • Newark (N. J.) • Philadelphia • Pittsburgh • Portland (Ore.) • Rome (N. Y.) • Rossmoyne (Ohio) (Cincinnati area) • St. Louis • San Francisco • Seattle • Syracuse • Tulsa • Washington, D. C.

"You see POWELL VALVES everywhere!"

And no wonder! For The William Powell Company makes more kinds of valves and has probably solved more valve problems than any other organization in the world.

Wherever flow requires dependable control, there's the place for Powell Valves—famous for dependability since 1846. Made ⅛" to 30" and 125 pounds to 2500 pounds W. S. P. Bronze, iron, steel and corrosion resistant alloys. Available through distributors in principal cities. On problems, write direct to The Wm. Powell Company, Cincinnati 22, Ohio.

CONTROLS FOR THE LIFE LINES OF INDUSTRY

Powell Valves 108th year

Companions IN RELIABLE SERVICE...

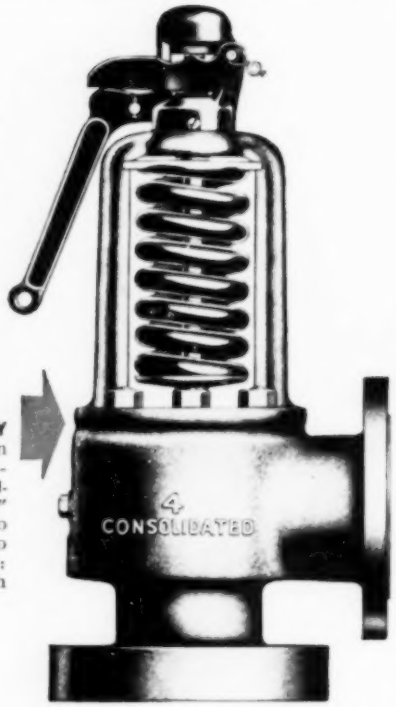
TYPES 1411 and 1415 CONSOLIDATED SAFETY VALVES

TYPE 1411

CAST IRON BODY SAFETY VALVE. Has bevel seat, single ring blow-down control and one-piece feather (disc). **Sizes:** 1½" through 6". **Pressures:** Up to 250 psi. **Temperatures:** Up to 450° F. **Standard Connections:** Threaded or flanged. All sizes available with oversize inlet flanges for replacement purposes.

TYPE 1415

CAST STEEL BODY SAFETY VALVE. Has a high erosion and corrosion-resistant stainless steel seat bushing **seal-welded to the base. Sizes:** ½" through 6". **Pressures:** Up to 900 psi. **Temperatures:** Up to 900° F. **Standard Connections:** Flanged. Available with oversize inlet flanges.



Dependable performance in hundreds of installations is the history of Consolidated Safety Valves Types 1411 and 1415. Time and time again, the high discharge capacity of these rugged valves has been thoroughly proved in the field. Positive, tight closing after operation is assured. Both types are simply constructed spring-loaded, wing-guided valves with few working parts. Adjustment is easy; maintenance economical.

Type 1411, with cast iron body, is excellent for installation on water tube boilers, mechanically-fired fire tube boilers, accumulators, unfired pressure vessels and pipe lines within its rated capacity. Types 1415, with cast steel body, is recommended for all applications beyond the scope of companion valve Type 1411.

Protect your personnel, facilities and production against the hazards of overpressures. Install precision-built Consolidated Safety Valves. Selection is easy. Write for Catalog 700.

CONSOLIDATED SAFETY VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONN.

MAKERS OF 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' AND 'AMERICAN-MICROSEN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'HANCOCK' VALVES, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

years of safe, sure, efficient lubrication ahead for these turbines with GULFCREST OIL

Modern equipment in a modern plant—line up of six large General Electric steam turbines in the O. H. Hutchings Station of the Dayton Power & Light Company generating plant which is located south of Dayton, Ohio, on the Miami River. Gulfcrest Oil provides the vital lubrication for all four units.

Gulfcrest's unmatched record of outstanding performance in every type of steam turbo-generator guarantees safe, sure, efficient protection for these six units down through the years.

A record like this did not just happen. It is the result of careful selection of crude oils that are thoroughly refined, then super-refined by Gulf's exclusive Alchlor Process—plus the right combination of the right chemical additives, and thorough testing.

Gulfcrest's performance record includes installations where the original fill has been in service more than 15 years.

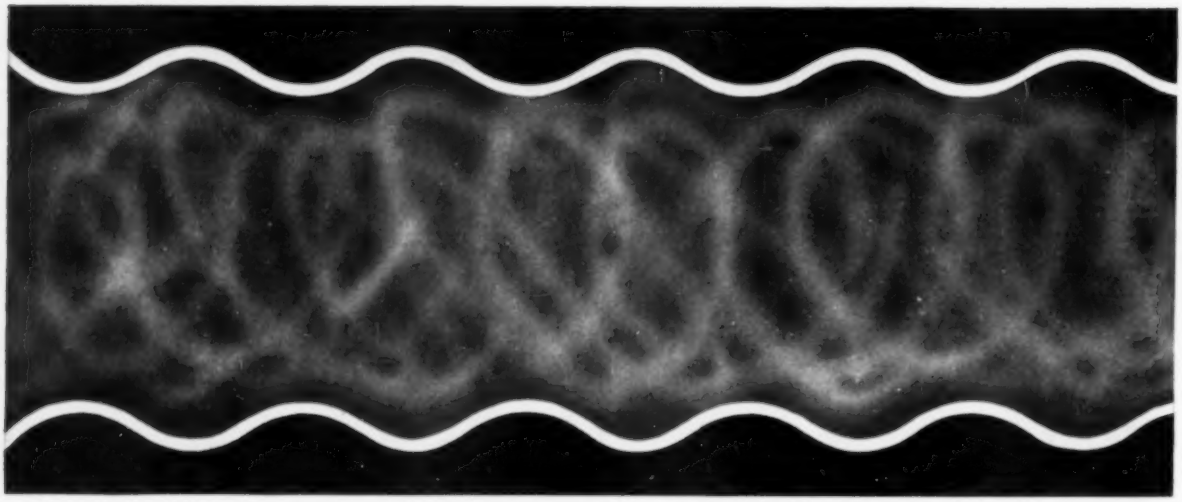
The next time you fill a turbine system, make it a fill for safe, sure, long-lasting protection. Specify the world's finest turbine oil—Gulfcrest. Call your nearest Gulf office today and have a Gulf Sales Engineer recommend the proper grade.

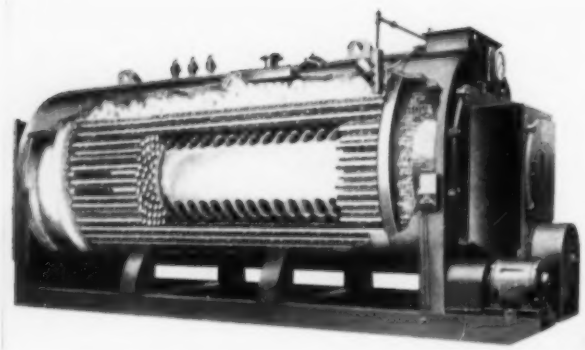
Gulf Oil Corporation · Gulf Refining Company

1822 Gulf Building Pittsburgh 30, Pennsylvania

GULF INDUSTRIAL LUBRICATION

Introducing
Continental's Spinning Gas Technique*





*In the Continental, air is forced through static turbine-like vanes which cause air to enter the furnace with a spinning motion. This technique achieves thorough mixing of air and atomized fuel, better combustion, a slower passage of hot gases through the furnace, and a greater amount of heat transfer. On the second pass, gases are spun again by means of a stationary impeller in each 3" return tube. So much heat is transferred by the two-pass design and spinning gas technique that an independent engineering firm found operating efficiency of the unit under test to be 84.23% . . . with steam quality at 99.43%.

Through use of the spinning gas technique the Continental Automatic Boiler achieves full combustion and over 80% efficiency by means of a two-pass design . . . Due to this technique and design the Continental costs little to maintain, gives long service life, and results in fuel costs equal to, if not lower than most other type packaged units.

Owners report that they can open a Continental for cleaning or inspection in less than a half hour—due to the hinged doors on both ends. Another owner reports fuel savings of 25%—the result of Continental's spinning gas technique and improved design.

For full details on the many exclusive features and advantages of the Continental Automatic Boiler—units from 20 to 500 hp; 15 to 200 lbs. W.P.—write for new Bulletin BE3.

CONTINENTAL BOILER DIVISION
BOILER ENGINEERING & SUPPLY COMPANY, INC.
Phoenixville, Pennsylvania

40 YEARS OF BOILER MANUFACTURING EXPERIENCE

CONTINENTAL is sold, installed and serviced by competent distributors throughout the U.S.

Saved → $16,000.00 in one year

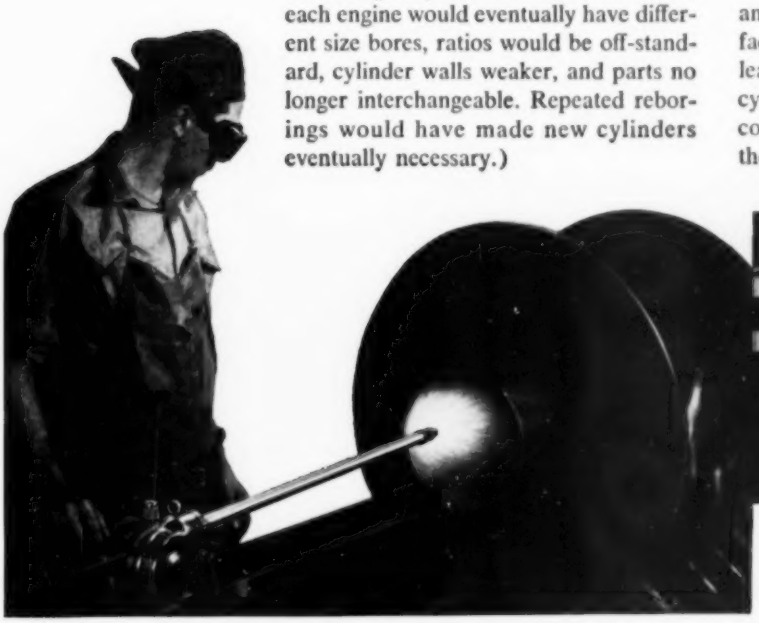
How one plant saved $16,000.00 in one year on one type of machine repair, with metallizing.

This large mid-West chemical plant uses fourteen gas engines, in compressor service, operating 24 hours a day. Fuel is a mixture of hydrogen, methane and air, with charcoal dust added to increase combustion efficiency.

Three methods of reconditioning these engines were available;

1. the cylinders could be replaced and standard sizes of other components preserved, at a cost of $450.00 per cylinder;
2. the cylinders could be rebored and fitted with oversized pistons and rings, at $400.00 per cylinder. (With this method, each engine would eventually have different size bores, ratios would be off-standard, cylinder walls weaker, and parts no longer interchangeable. Repeated reborings would have made new cylinders eventually necessary.)
3. Metallizing, at $125 to $150 a cylinder.

Cylinders are bored, threaded, grit-blasted, degreased and sprayed with Metcoloy #2 Stainless Steel, 20 to 30 pounds being applied. Cylinders are then finish-machined and honed to size. In the first year 64 cylinders were re-surfaced at a total saving of about $16,000.00, over the unsatisfactory method of reboring and fitting with oversized rings and pistons—$19,200.00 over the cost of new cylinders. Past experience with the greater particle hardness of sprayed metal, its better lubrication characteristics and the superiority of the stainless steel surface over the original cast steel cylinders leads this user to estimate that the rebuilt cylinders are good for another 15 years of continuous operation, about 50% more than the original life before reconditioning.



ABOVE: Gas engine—cylinders reconditioned with metallizing.

LEFT: Gas engine cylinder—being metallized while rotating in improvised jig set-up.

See examples of metallizing illustrated in our 8-page Bulletin in your Sweet's Plant Engineering File—Section 7a/Me.

Just One Example. This is just one among many money-saving applications of metallizing in this plant. Almost any rotating or sliding machine part subject to wear, can be reconditioned with this modern repair process. Parts are kept to standard sizes, replacement stocks can be cut, and production "downtime" caused by delivery delays or shortages of new parts is eliminated.

Further Information. Send off the coupon for a call by a factory-trained Metco Field Engineer, or a copy of Bulletin 51B, "Metallizing—Its Practical Applications"

The following trade names are the property of Metallizing Engineering Co., Inc., Metco, Metcoloy *Reg. U.S. Pat. Off.*

METALLIZING ENGINEERING CO., INC.
38-14 30th Street · LONG ISLAND CITY 1, N. Y.
In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD. Chobham near Woking, England

Don N. Watson
METALLIZING ENGINEERING CO., INC.
38-14 30th Street
Long Island City 1, N. Y.

☐ Please have Metco Field Engineer call.

☐ Please send me, without obligation, "Metallizing—Its Practical Applications"

NAME_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

FISHER® FACTORIES

MARSHALLTOWN, IOWA

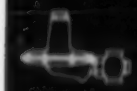
• Above—Factory No. 1. Over 255,000 sq. ft. of floor space. The industry's most modern plant. Here the world's largest production of pressure and liquid level control equipment is made possible by Fisher's unequalled research, design, engineering, testing and manufacturing facilities.

• At Left—Factory No. 2. Over 67,000 sq. ft. of floor space. A major unit in Fisher's continuing expansion program of increased facilities and production.

FISHER®

PRESSURE REGULATORS

•

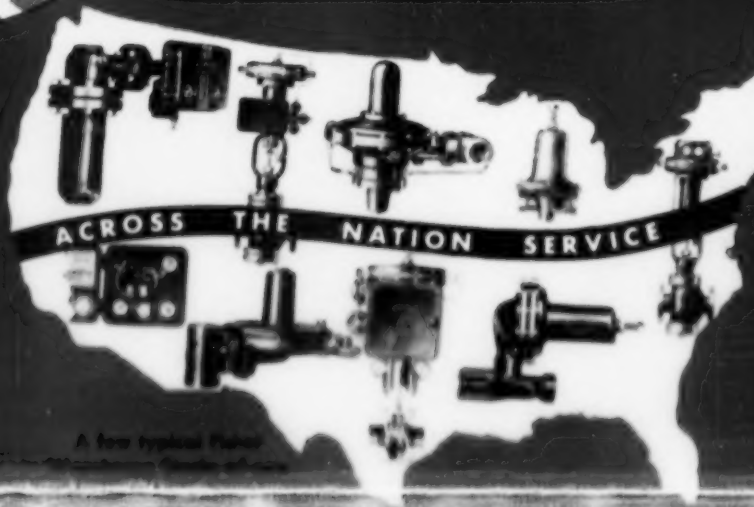


GAS REGULATORS

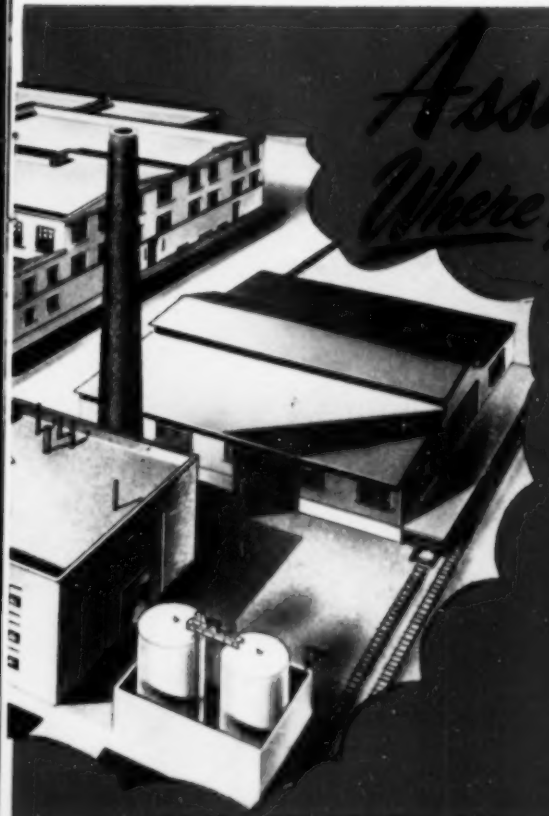
•

LIQUID LEVEL CONTROLLERS

•



AND FIELD STOCKS



Assure You Delivery

Where you want it! When you want it!

YOU SAY WHEN AND WHERE AND WE'LL BE THERE!

You are always close to a source of supply of Fisher control valves, gas regulators, liquid level controllers and pressure regulators.

Whether your problem is one of existing equipment—or an entirely new control application—the Fisher nation-wide network of 19 strategically located field stocks and 41 representatives—with over 200 Fisher Service Engineers—offers you immediate and convenient service on all your control requirements.

FISHER GOVERNOR COMPANY

MARSHALLTOWN, IOWA

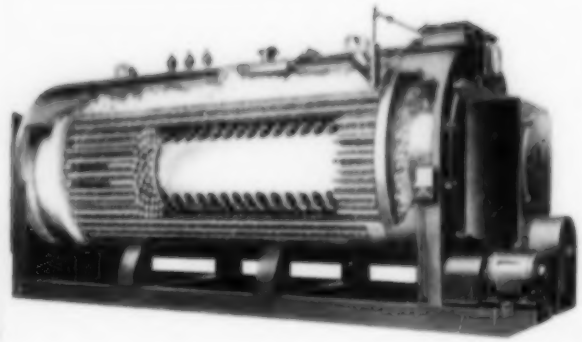
FISHER SERVICE DIRECTORY

ALBANY
Malcolm W. Black & Co.
* AMARILLO
Vinson Supply Co.
ATLANTA
Rittelmeyer & Co., Inc.
BALTIMORE
Rhodes Controls Co.
BIRMINGHAM
Jos. W. Eshelman & Co., Inc.
BOSTON (West Newton)
Wickersham, Petty & Co.
BUFFALO
W. J. Sommers Co.
* CALGARY
Barber Engineering & Supply Co.
CHARLOTTE
Robert E. Mason & Co.
CHICAGO
General Meters & Controls Co.
CINCINNATI
Harry T. Porter Co.
CLEVELAND
A. E. Ehrke & Co.
* CORPUS CHRISTI
Potter Services Co.
* DALLAS
Vinson Supply Co.
* DENVER
Jay & Cox, Inc.
* DETROIT
Dubois-Webb Co.
HONOLULU
H. S. Gray Co.
* HOUSTON
Potter Services Co.
INDIANAPOLIS
Arlco Engineering Agency
KANSAS CITY
Sullivan Meters Co.
* LOS ANGELES
Lawrence Company
LOUISVILLE
Allen P. Cook Co.
* MARSHALLTOWN
Fisher Governor Co.
MEMPHIS
Johnson & Scott
MILWAUKEE
Morgan D. Hicks & Co.
MINNEAPOLIS (Hopkins)
J. F. Schultz & Co.
* MONTREAL
Process & Steam Specialties, Inc.
MUSKEGON
DuBois-Webb Co.
NARBERTH, PA.
Clifford B. Ives & Co.
NASHVILLE
Johnson & Scott
* NEW ORLEANS
John H. Carter Co.
NEW YORK
Malcom W. Black & Co.
NORTH LITTLE ROCK
Johnson & Scott
* ODESSA, TEXAS
Vinson Supply Co.
PHOENIX
Cone & Wallace Co.
PITTSBURGH
W. A. Staeltzing
* PORTLAND, ORE.
Richard H. Brown & Co.
RICHMOND
W. H. Kidd & Co.
* SAN FRANCISCO
George P. Frederick & Co.
SAN JUAN
P. A. Ortiz & Co.
SALT LAKE CITY
Williams, Gritton & Wilde
* SEATTLE
Everett A. Hall
* SHREVEPORT
Potter Services Co.
* SOUTH EDMONTON
Barber Engineering & Supply Co.
ST. LOUIS
H. D. Hale & Co.
* TORONTO
George W. Reavell & Co., Ltd.
* TULSA
Vinson Supply Co.
VANCOUVER
Northern Columbia Process Equipment Co.
WICHITA
Sullivan Meters Co.

year on the type of machine repair, with metallizing.

mixture of hydrogen, methane and charcoal dust added to increase combustion efficiency.

Stainless Steel, 20 to 30 pounds being applied. Cylinders are then finish-machined



"In the Continental, air is forced through static turbine-like vanes which cause air to enter the furnace with a spinning motion. This technique achieves thorough mixing of air and atomized fuel, better combustion, a slower passage of hot gases through the furnace, and a greater amount of heat transfer. On the second pass, gases are spun again by means of a stationary impeller in each 3" return tube. So much heat is transferred by the two-pass design and spinning gas technique that an independent engineering firm found operating efficiency of the unit under test to be 84.23% . . . with steam quality at 99.43%.

Through use of the spinning gas technique the Continental Automatic Boiler achieves full combustion and over 80% efficiency by means of a two-pass design . . . Due to this technique and design the Continental costs little to maintain, gives long service life, and results in fuel costs equal to, if not lower than most other type packaged units.

Owners report that they can open a Continental for cleaning or inspection in less than a half hour—due to the hinged doors on both ends. Another owner reports fuel savings of 25%—the result of Continental's spinning gas technique and improved design.

For full details on the many exclusive features and advantages of the Continental Automatic Boiler—units from 20 to 500 hp; 15 to 200 lbs. W.P.—write for new Bulletin BE3.

CONTINENTAL BOILER DIVISION
BOILER ENGINEERING & SUPPLY COMPANY, INC.
Phoenixville, Pennsylvania

40 YEARS OF BOILER MANUFACTURING EXPERIENCE

CONTINENTAL is sold, installed and serviced by competent distributors throughout the U.S.

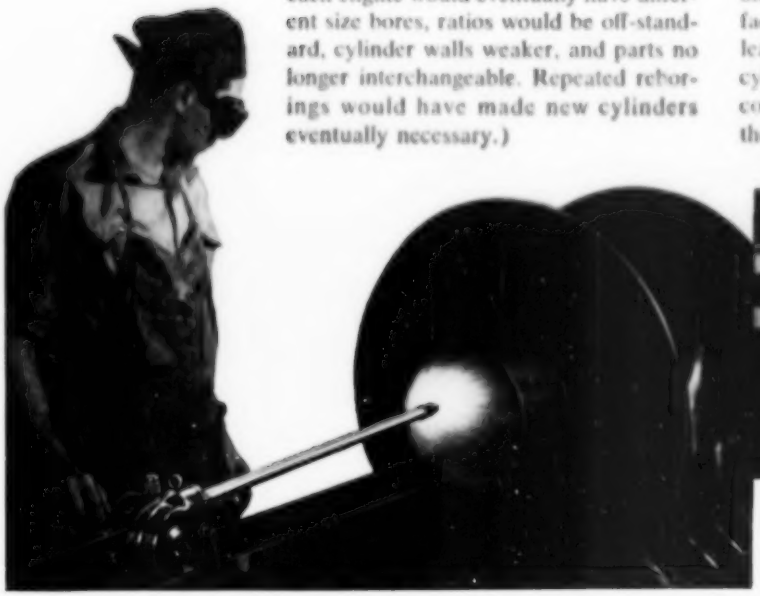
with metallizing.

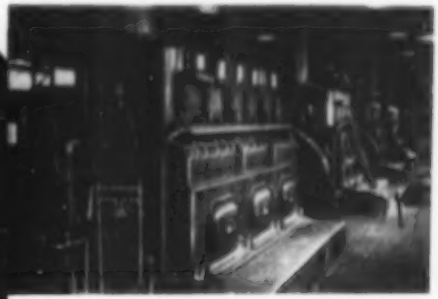
efficiency.

Three methods of reconditioning these engines were available;

1. the cylinders could be replaced and standard sizes of other components preserved, at a cost of $450.00 per cylinder;
2. the cylinders could be rebored and fitted with oversized pistons and rings, at $400.00 per cylinder. (With this method, each engine would eventually have different size bores, ratios would be off-standard, cylinder walls weaker, and parts no longer interchangeable. Repeated reborings would have made new cylinders eventually necessary.)

plied. Cylinders are then finish-machined and honed to size. In the first year 64 cylinders were re-surfaced at a total saving of about $16,000.00, over the unsatisfactory method of reboring and fitting with oversized rings and pistons—$19,200.00 over the cost of new cylinders. Past experience with the greater particle hardness of sprayed metal, its better lubrication characteristics and the superiority of the stainless steel surface over the original cast steel cylinders leads this user to estimate that the rebuilt cylinders are good for another 15 years of continuous operation, about 50% more than the original life before reconditioning.





ABOVE: Gas engine—cylinders reconditioned with metallizing.

LEFT: Gas engine cylinder—being metallized while rotating in improvised jig set-up.

See examples of metallizing illustrated in our 8-page Bulletin in your Sweet's Plant Engineering File—Section 7a/Me.

Just One Example. This is just one among many money-saving applications of metallizing in this plant. Almost any rotating or sliding machine part subject to wear, can be reconditioned with this modern repair process. Parts are kept to standard sizes, replacement stocks can be cut, and production "downtime" caused by delivery delays or shortages of new parts is eliminated.

Further Information. Send off the coupon for a call by a factory-trained Metco Field Engineer, or a copy of Bulletin 51B, "Metallizing—Its Practical Applications"

The following trade names are the property of Metallizing Engineering Co., Inc., Metco®, Metcoloy ®Reg. U.S. Pat. Off.

METALLIZING ENGINEERING CO., INC.
38-14 30th Street · METCO METALLIZED · LONG ISLAND CITY 1, N. Y.
In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD., Chobham near Woking, England

Don N. Watson
METALLIZING ENGINEERING CO., INC.
38-14 30th Street
Long Island City 1, N. Y.

☐ Please have Metco Field Engineer call.

☐ Please send me, without obligation, "Metallizing—Its Practical Applications"

NAME_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

FISHER® FACTORIES

MARSHALLTOWN, IOWA

• Above—Factory No. 1. Over 255,000 sq. ft. of floor space. The industry's most modern plant. Here the world's largest production of pressure and liquid level control equipment is made possible by Fisher's unequalled research, design, engineering, testing and manufacturing facilities.

• At Left—Factory No. 2. Over 67,000 sq. ft. of floor space. A major unit in Fisher's continuing expansion program of increased facilities and production.

FISHER

PRESSURE REGULATORS

•

GAS REGULATORS

•

LIQUID LEVEL CONTROLLERS

•

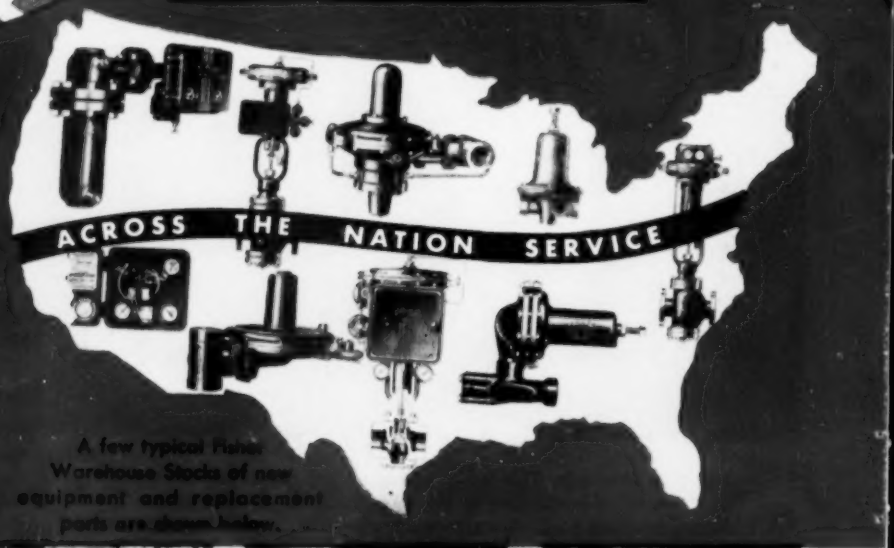
DIAPHRAGM CONTROL VALVES

•

PUMP GOVERNORS

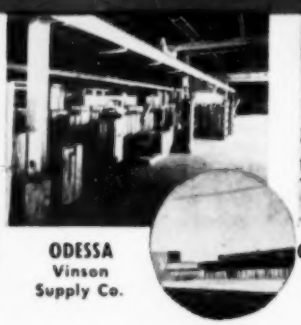
•

LEVER and FLOAT VALVES



A few typical Fisher Warehouse Stocks of new equipment and replacement parts are shown below.

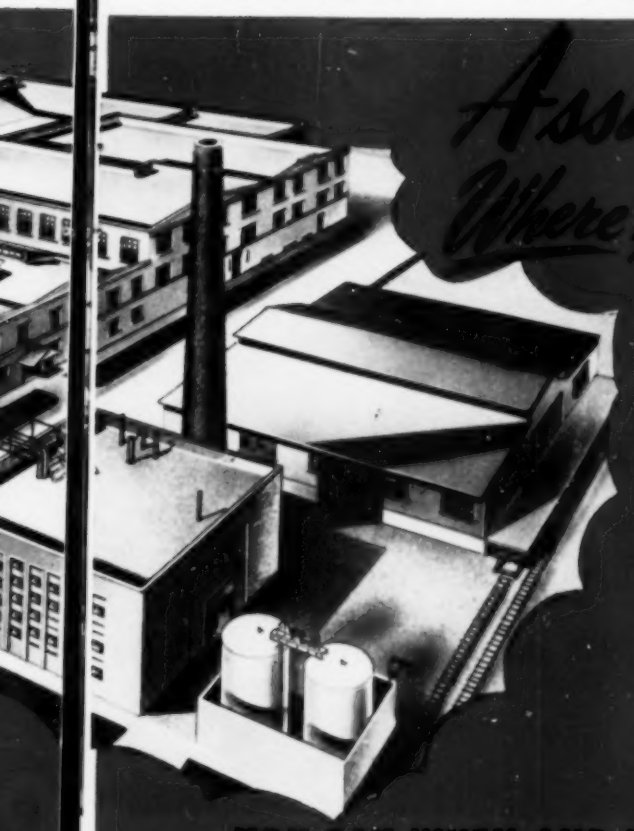
LOS ANGELES
Carter-Jones Co.



ODESSA
Vinson Supply Co.

CORPUS CHRISTI
Puffer-Sweiven Co.

AND FIELD STOCKS



Assure You Delivery

Where you want it! When you want it!

YOU SAY WHEN AND WHERE AND WE'LL BE THERE!

You are always close to a source of supply of Fisher control valves, gas regulators, liquid level controllers and pressure regulators.

Whether your problem is one of existing equipment—or an entirely new control application—the Fisher country-wide network of 19 strategically located field stocks and 49 representatives—with over 200 Fisher Service Engineers—offers you immediate and convenient service on all your control requirements.

FISHER GOVERNOR COMPANY

MARSHALLTOWN, IOWA

WORLD LEADER IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL

FISHER SERVICE DIRECTORY

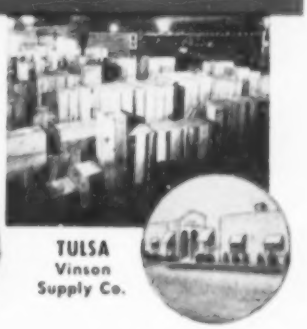
ALBANY
Malcolm W. Black & Co.
* **AMARILLO**
Vinson Supply Co.
ATLANTA
Rittelmeyer & Co., Inc.
BALTIMORE
Rhodes Controls Co.
BIRMINGHAM
Jos. W. Eshelman & Co., Inc.
BOSTON (West Newton)
Wickersham, Petty & Co.
BUFFALO
W. J. Sommers Co.
* **CALGARY**
Barber Engineering & Supply Co.
CHARLOTTE
Robert E. Mason & Co.
CHICAGO
General Meters & Controls Co.
CINCINNATI
Harry T. Porter Co.
CLEVELAND
A. E. Ehrke & Co.
* **CORPUS CHRISTI**
Puffer-Sweiven Co.
* **DALLAS**
Vinson Supply Co.
* **DENVER**
Joy & Cox, Inc.
* **DETROIT**
DuBois-Webb Co.
HONOLULU
H. S. Gray Co.
* **HOUSTON**
Puffer-Sweiven Co.
INDIANAPOLIS
Acme Engineering Agency
KANSAS CITY
Sullivan-Mears Co.
* **LOS ANGELES**
Carter-Jones Company
LOUISVILLE
Allan K. Cook Co.
* **MARSHALLTOWN**
P. S. Stover Co.
MEMPHIS
Johnson & Scott
MILWAUKEE
Warren D. Ehrke & Co.
MINNEAPOLIS (Hopkins)
J. F. Schultz & Co.
* **MONTREAL**
Process & Steam Specialties, Inc.
MUSKEGON
DuBois-Webb Co.
NARBERTH, PA.
Clifford B. Ives & Co.
NASHVILLE
Johnson & Scott
* **NEW ORLEANS**
John H. Carter Co.
NEW YORK
Malcom W. Black & Co.
NORTH LITTLE ROCK
Johnson & Scott
* **ODESSA, TEXAS**
Vinson Supply Co.
PHOENIX
Cone & Wallace Co.
PITTSBURGH
W. A. Stoeltzing
* **PORTLAND, ORE.**
Robert H. Brown & Co.
RICHMOND
W. H. Kidd & Co.
* **SAN FRANCISCO**
George P. Friederich & Co.
SAN JUAN
P. A. Ortiz & Co.
SALT LAKE CITY
Williams, Gritton & Wilde
* **SEATTLE**
Barrett & Yost
* **SHREVEPORT**
John H. Carter Co.
* **SOUTH EDMONTON**
Barber Engineering & Supply Co.
ST. LOUIS
H. D. Hale & Co.
* **TORONTO**
George W. Beecroft Co., Ltd.
* **TULSA**
Vinson Supply Co.
VANCOUVER
Northern Columbia Process Equipment Co.
WICHITA
Sullivan-Mears Co.

* Indicates Field Stocks.

HOUSTON
Puffer-Sweiven Co.

NEW ORLEANS
John H. Carter Co.

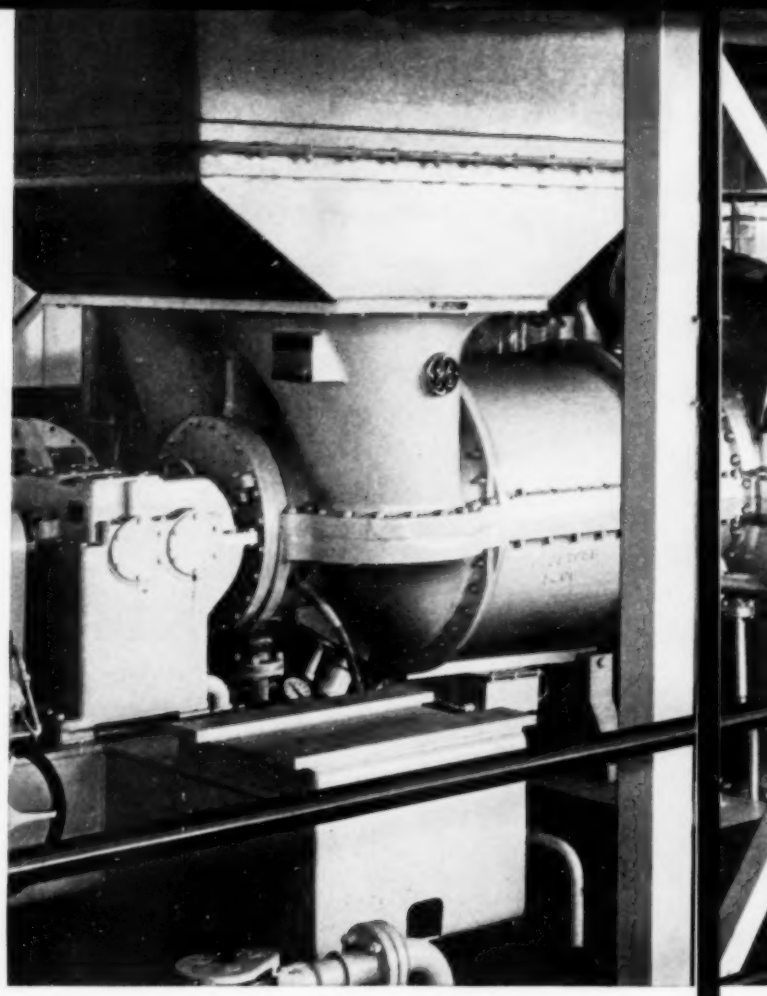
DALLAS
Vinson Supply Co.



TULSA
Vinson Supply Co.

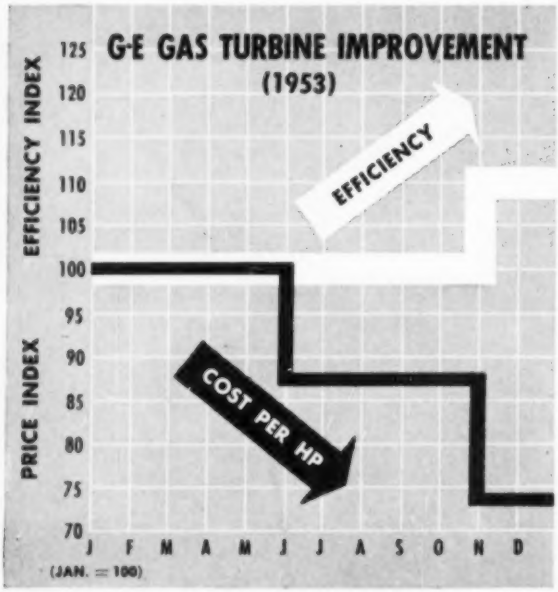
GAS TURBINE

progress report



In the past year, G-E engineers have reduced the cost per hp of the G-E gas turbine—and boosted its efficiency an average of 11 per cent. You may be able to put this versatile prime mover to work providing low-cost power for your plant.

Increased Efficiency, Versatility,



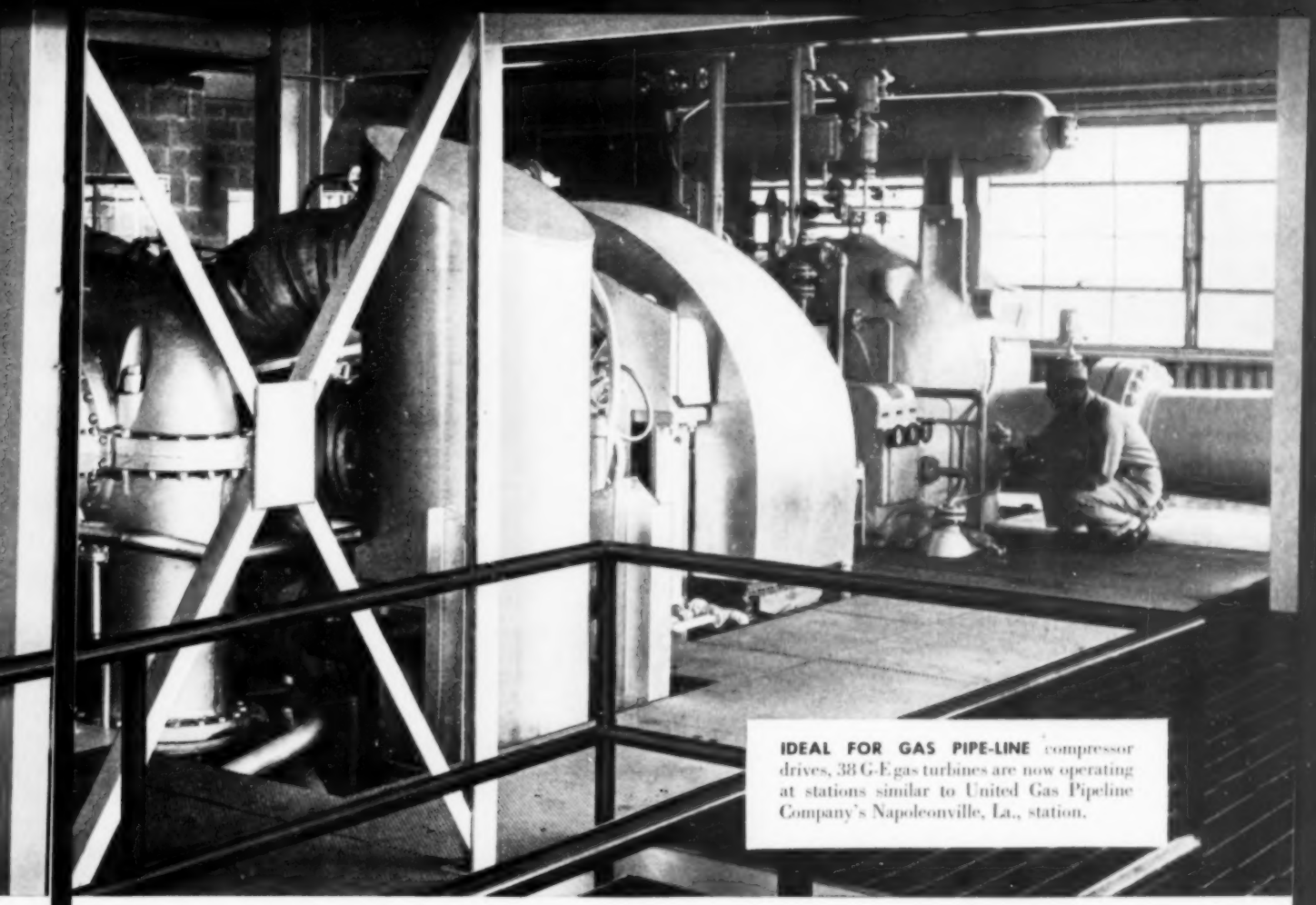
GREATER EFFICIENCY AND LOWER COST PER HP, achieved by improved design and manufacturing techniques, were significant G-E gas-turbine advances in 1953.

G-E GAS TURBINE OPERATING RECORD

(As of March 15, 1954)

TYPE OF SERVICE	NO. OF UNITS	OPERATING HOURS
LOCOMOTIVES	11	60,000
POWER GENERATION	16	70,000
GAS PIPE-LINE PUMPING	38	150,000
PETRO-CHEMICAL	1	3,000
TOTAL	66	283,000

UNEQUALED RECORD for operating hours and diversity of application, shows versatility and dependability of G-E gas turbine, gives G-E engineers vital data for future progress.



IDEAL FOR GAS PIPE-LINE compressor drives, 38 G-E gas turbines are now operating at stations similar to United Gas Pipeline Company's Napoleonville, La., station.

Lower Cost Per Horsepower Mark G-E Gas-turbine Progress

In less than five years, what was a completely new, un-tried prime mover has been shaped into a dependable, economical means of power. Already G-E turbines have racked up over 280,000 hours driving railroad locomotives, generating electric power, and turning high-speed compressors for gas pipe-line pumping and other industrial processes.

In the past year alone, G-E engineers have reduced the cost per horsepower for the gas turbines an average of 26 per cent. In the same short span, they have boosted efficiency an average of 11 per cent.

Outstanding among recent improvements is an integral base on which the turbine and its auxiliary equipment are permanently mounted and shipped—substantially reducing installation costs.

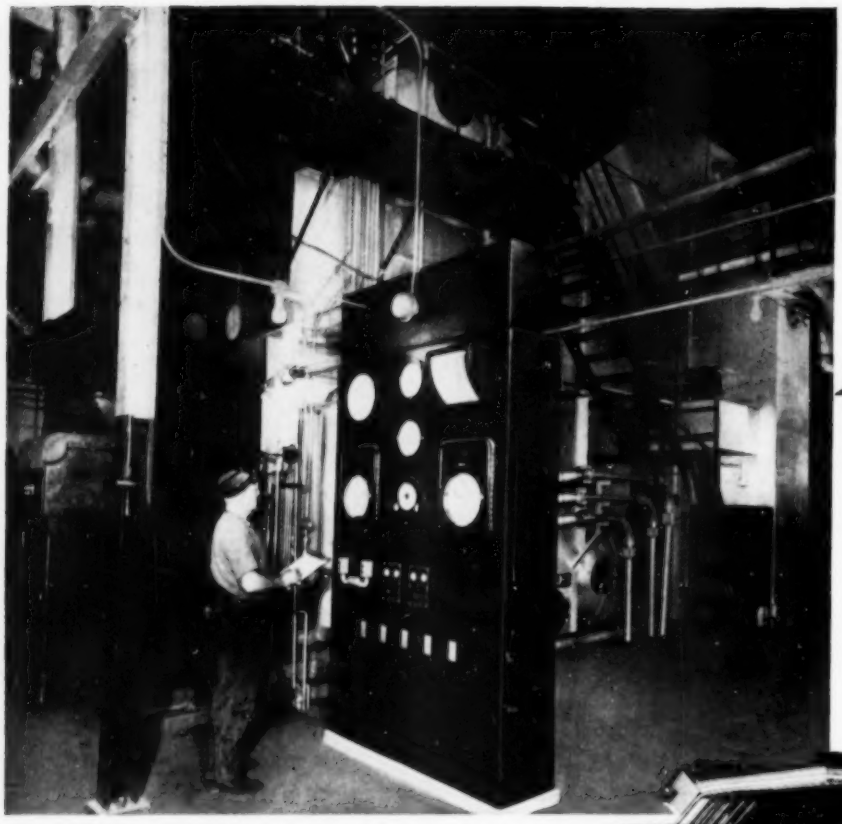
How could all this happen? General Electric, leader in the design and manufacture of both steam turbines and jet engines, was well equipped to develop the combustion gas turbine. Now, with thousands of hours of operating experience already accumulated, and with a factory designed exclusively for their manufacture, G.E. is leading the way in the gas turbine field.

If you would like more information on the gas turbine, contact your nearest G-E Apparatus Sales Office or write to General Electric Company, Section 255-10, Schenectady 5, New York.

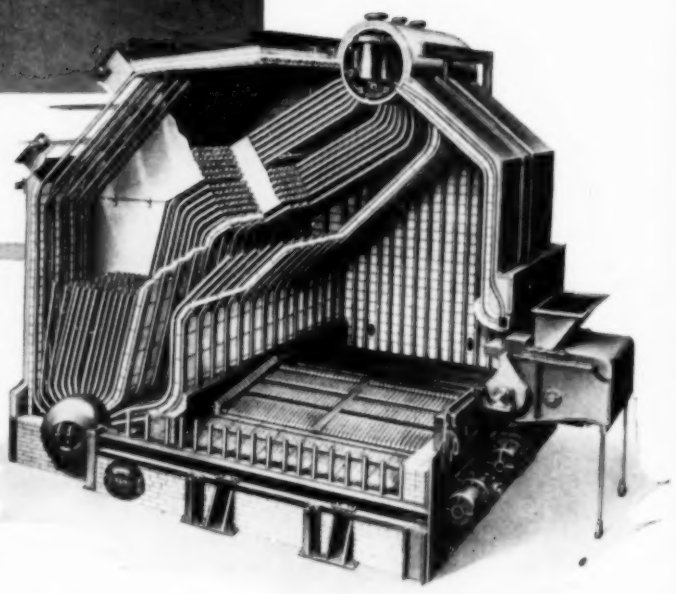
You can put your confidence in—

GENERAL ELECTRIC

VERIFIED FUEL SAVINGS



Boiler operator checks readings on control panel of company's new stoker-fired B&W Integral-Furnace Boiler, Type FF, which has performed so satisfactorily that fuel savings of more than 40 per cent have been estimated.



View of typical stoker-fired B&W Integral-Furnace Boiler, Type FF, similar to unit in service at Food Machinery & Chemical Corporation's Middleport, N. Y. plant. Suitable for stoker, gas, and oil firing, this B&W Unit is available in a steam capacity range of 8000 to 50,000 lb per hr at pressures to 600 psi. Complete design and operating details are described and illustrated in Bulletin G-71. Write The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

with a B&W Integral-Furnace Boiler

at

FOOD MACHINERY & CHEMICAL CORPORATION

"Good job—well done", is the comment of the Niagara Chemical Division of Food Machinery & Chemical Corporation, regarding the installation and continuing superior performance of a B&W stoker-fired boiler and air heater at this plant. Data on a weighed-coal metered-water test, run continuously for three days, showed that 128,180 lb of 13,105 Btu coal were required to produce 1,464,400 lb of steam. The operating conditions were—100 psi boiler pressure—feedwater at 225 F. The overall efficiency of this B&W Unit was calculated at 86.6% against a guaranteed 84% at 20,000 lb of steam per hr.

Plans for this installation at the Middleport, N. Y. plant followed central-station principles and were based on a complete survey, including operating data, made by the consulting engineer engaged by this nation-wide organization. At this point B&W engineers took over to handle complete erection . . . to place the boiler in operation . . . train operating personnel . . . and, finally, to turn over to the Niagara Chemical Division, a satisfactory, efficiently operating B&W unit that has since continued to live up to its reputation for reliable, economical service.

Service-Proved

COST SAVING FEATURES

of B&W Integral-Furnace Boilers for Steam Requirements from 2,800 to 350,000 Lb. Per Hr.

- Minimum floor space and headroom requirements
- High fuel economy
- Smokeless combustion
- Adaptable to all fuels and firing methods
- Economical fast steaming
- Water-cooled furnace
- Clean, dry steam at all ratings, even with high boiler water concentration
- Quick response to wide and heavy load swing demands
- Easy to inspect and clean
- High availability with least attention

BABCOCK & WILCOX
BOILER DIVISION

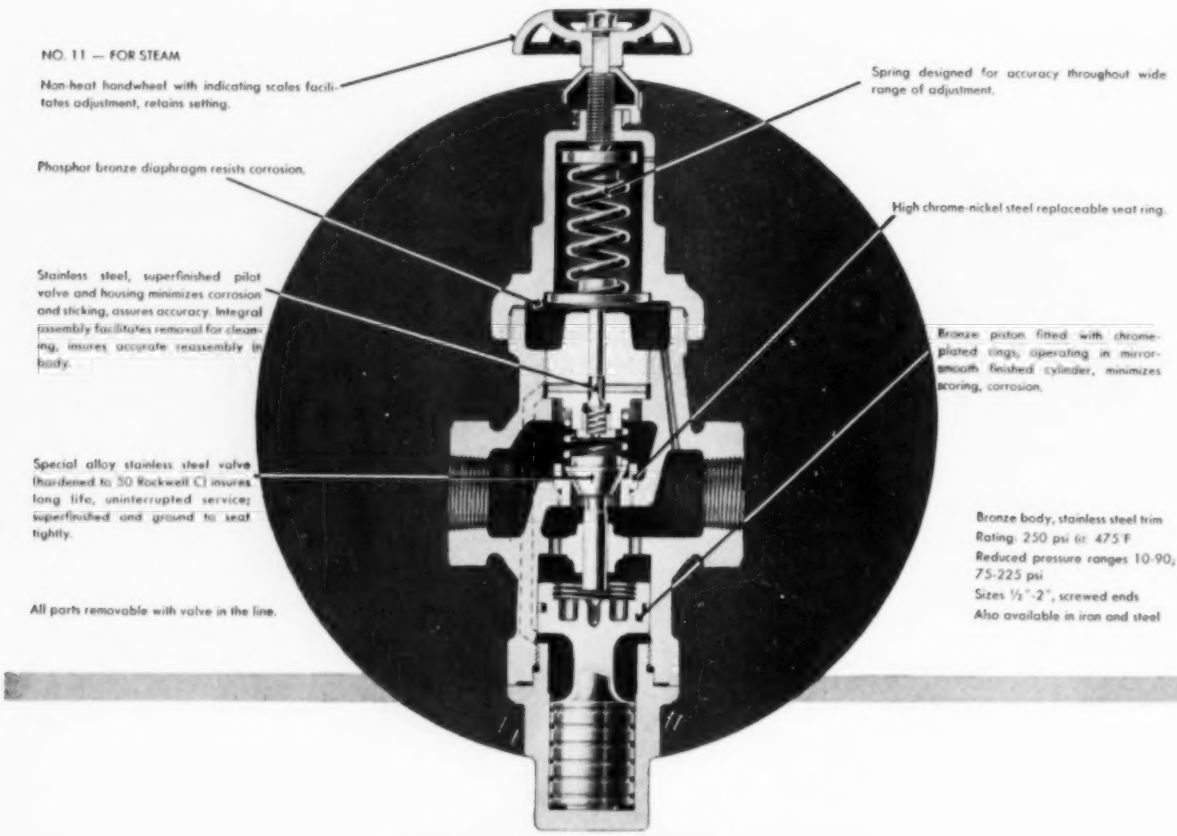
G-591

MASONEILAN

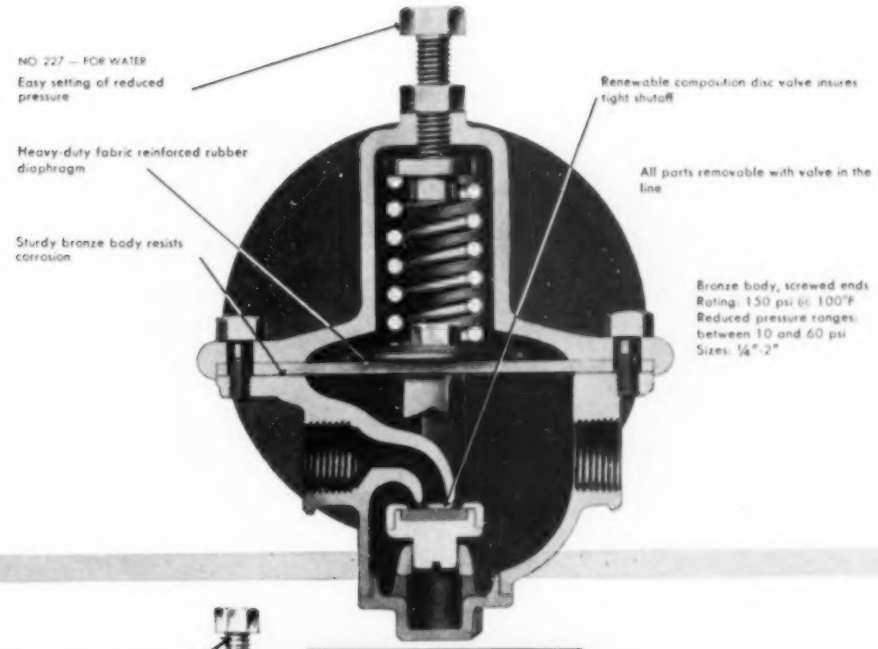
Some Quick Tips from Mason-Neilan on

SELECTING A PRESSURE REGULATOR

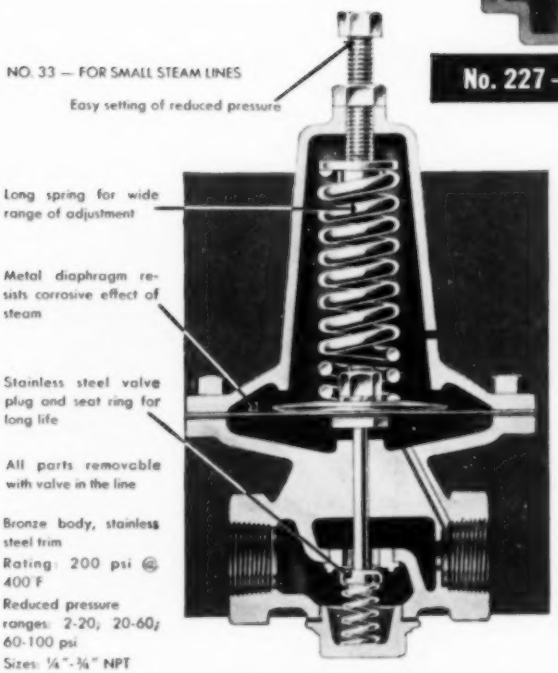
The best regulating valve for any specific application is the one that meets your accuracy requirements, fits the operating conditions, and gives you the lowest combination of maintenance and initial costs. Mason-Neilan engineers or your Mason-Neilan Distributor will be glad to discuss your problem, and help you to make this analysis. But here are some important features you should know and look for that will help you to make your own selection.


NO. 11 — FOR STEAM
Non-heat handwheel with indicating scales facilitates adjustment, retains setting.
Phosphor bronze diaphragm resists corrosion.
Stainless steel, superfinished pilot valve and housing minimizes corrosion and sticking, assures accuracy. Integral assembly facilitates removal for cleaning, insures accurate reassembly in body.
Special alloy stainless steel valve (hardened to 50 Rockwell C) insures long life, uninterrupted service; superfinished and ground to seat tightly.
All parts removable with valve in the line.
Spring designed for accuracy throughout wide range of adjustment.
High chrome-nickel steel replaceable seat ring.
Bronze piston fitted with chrome-plated rings, operating in mirror-smooth finished cylinder, minimizes scoring, corrosion.
Bronze body, stainless steel trim
Rating: 250 psi @ 475°F
Reduced pressure ranges 10-90, 75-225 psi
Sizes ½"-2", screwed ends
Also available in iron and steel

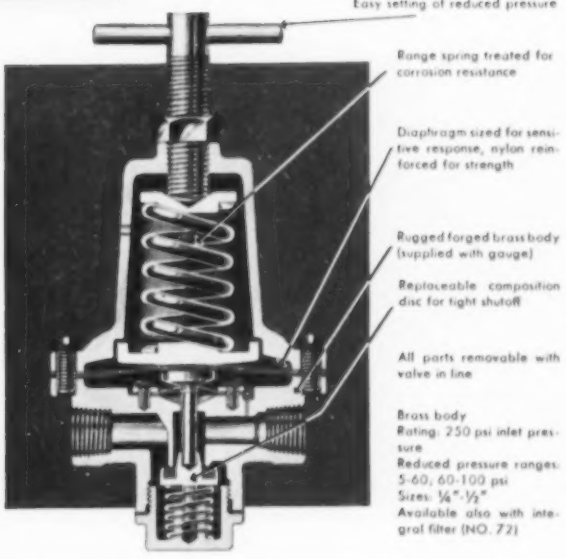
No. 11 – For Steam


NO. 227 — FOR WATER
Easy setting of reduced pressure
Heavy-duty fabric reinforced rubber diaphragm
Sturdy bronze body resists corrosion
Renewable composition disc valve insures tight shutoff
All parts removable with valve in the line
Bronze body, screwed ends
Rating: 150 psi @ 100°F
Reduced pressure ranges: between 10 and 60 psi
Sizes: ¼"-2"

No. 227 – For Water


NO. 33 — FOR SMALL STEAM LINES
Easy setting of reduced pressure
Long spring for wide range of adjustment
Metal diaphragm resists corrosive effect of steam
Stainless steel valve plug and seat ring for long life
All parts removable with valve in the line
Bronze body, stainless steel trim
Rating: 200 psi @ 400°F
Reduced pressure ranges: 2-20, 20-60, 60-100 psi
Sizes: ¼"-¾" NPT

No. 33 – For Small Steam Lines


NO. 71 FOR AIR
Easy setting of reduced pressure
Range spring treated for corrosion resistance
Diaphragm sized for sensitive response, nylon reinforced for strength
Rugged forged brass body (supplied with gauge)
Replaceable composition disc for tight shutoff
All parts removable with valve in line
Brass body
Rating: 250 psi inlet pressure
Reduced pressure ranges: 5-60, 60-100 psi
Sizes: ¼"-½"
Available also with integral filter (NO. 72)

No. 71 – For Air

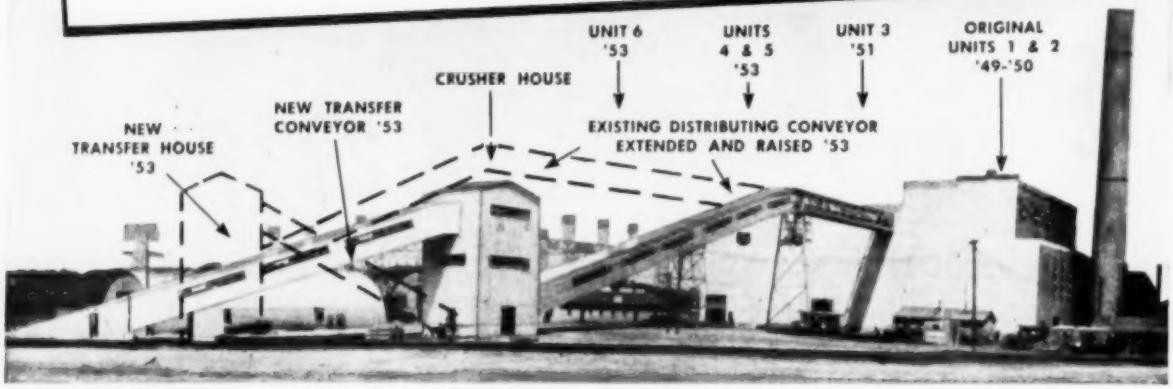
ALL HIGH Quality Coefficient PRODUCTS

MASON-NEILAN REGULATOR CO.

1206 ADAMS STREET, BOSTON 24, MASS., U. S. A.

Sales Offices or Distributors in the Following Cities: New York • Syracuse • Chicago • St. Louis • Tulsa • Philadelphia • Houston Pittsburgh • Atlanta • Cleveland • Cincinnati • Detroit • San Francisco • Boise • Louisville • Salt Lake City • El Paso Albuquerque • Odessa • Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham New Orleans • Dallas • Seattle • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

REPEAT ORDER!



Dotted lines show additions since 1950 to original White River station of Indianapolis Power & Light. Two units were added without change in the coal handling system. However, a fifth unit was built in 1953, requiring the above change in the system. Provision was made at this time for a future sixth unit.

For the fourth time in recent years, Indianapolis Power & Light relies on Link-Belt coal handling equipment and experience

PROOF of the versatility of Link-Belt engineering is the White River station of Indianapolis Power & Light. Not only did the initial plans provide for future expansion, but when loads exceeded the forecast, Link-Belt—working with IPL's consultants, Gibbs & Hill—designed a low-cost revamp of the coal handling system that can fuel two additional generating units.

So smoothly was the changeover accomplished that the station was back on the line in 12 hours. And you, too, will find it pays to put the experience gained on hundreds of power plant jobs to work for you.

Link-Belt can offer all types and sizes of equipment for unloading, storing, reclaiming, conveying, elevating and feeding your coal.

Your nearby Link-Belt sales representative will be glad to work with you and your consultants . . . help analyze your coal handling requirements. And be sure to ask him for a copy of Book 2410 that shows the latest in equipment and layouts for power plants large and small.

Distributing belt conveyor rolls on 36-in. Link-Belt roller bearing idlers. Coal is discharged to bunkers by self-propelled tripper that opens and closes bunker seals to contine dust.

LINK-BELT

COAL HANDLING EQUIPMENT

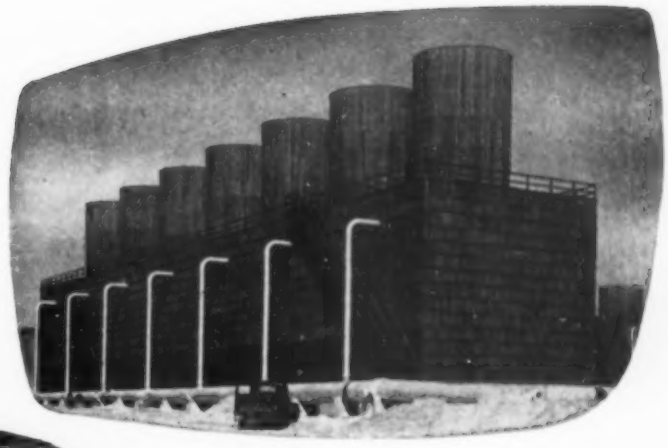
Write for 42-page Link-Belt Power Plant Book 2410

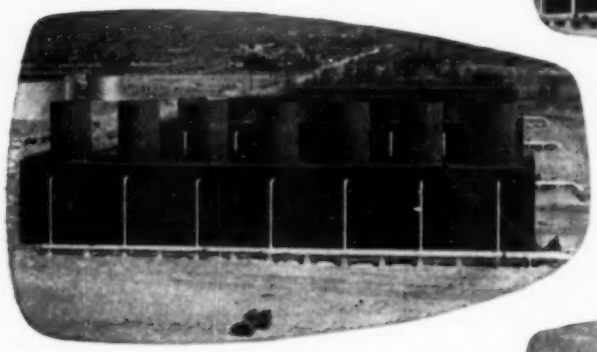
LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

12,519

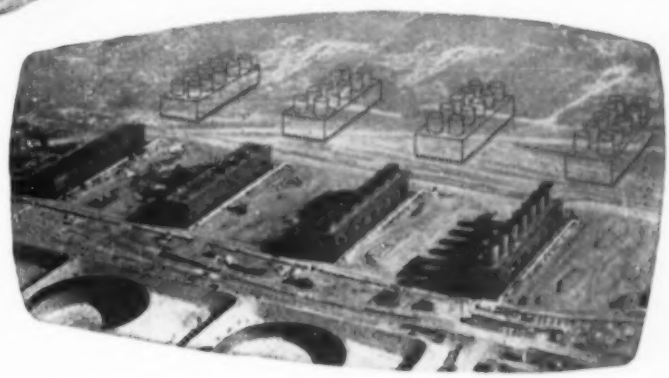
FLUOR *is building*

the world's largest initial cooling tower installation





These Fluor Counterflo Cooling Towers are now being erected in the San Fernando Valley at the site of the new 512,000 KW steam-electric generating plant for the Department of Water and Power, City of Los Angeles. They comprise the largest initial cooling water circulating system utilizing cooling towers ever built.



The power plant itself is the largest initial installation inland and is being constructed in two sections. The first section consists of two units of 100,000 KW each, the second section of two units of 156,000 KW each. The four Fluor towers shown here (28 cells) in progressive stages of erection, are designed at 36,000 g.p.m. each, with a maximum of 42,000 g.p.m. They will service the first section of the plant. Design cooling range is 14° F with water entering at a temperature of 95° F and leaving at 81° F. The design wet bulb temperature is 70° F. Heat load is 1 billion B.t.u./Hr. for the first four towers.

Each cooling tower is 250 ft. long, 42 ft. wide and 37.5 ft. high to the fan deck. Twenty-foot, four-bladed fans are driven by 40 H.P. motors. Each fan moves 436,000 CFM. Capacity rating is 144,000 g.p.m. through a low pressure water distributing system. A distinctive feature of these towers is the Fluor-designed redwood stack standing 30 ft. high to minimize recirculation at peak load conditions.

Ground has been broken for the erection of four additional Fluor towers to serve the second section of the plant. Each tower will consist of 5 double-cells for a total of 40, with water circulation of 136,800 g.p.m. Design duty: inlet temperature 101° F, outlet 80° F, wet bulb 70° F. Heat load is 1,440,000,000 B.t.u./Hr. Dimension of these towers: 180 ft. long, 66 ft. wide, 45 ft. high to fan decks. Fans (18 ft.) will be driven by 40 HP motors and each will move approximately 350,000 CFM.

In addition, an auxiliary system (the bearing cooling water) employs a 4-cell Fluor Tower with a heat load of 40 million B.t.u./Hr.

When completed, total cooling water circulation will exceed 280,000 g.p.m. and *will circulate over 240 miles of condenser copper tubing.* Total heat load will approach 2½ billion B.t.u./Hr. The big jobs can be entrusted to Fluor, a firm with 33 years experience in the design and manufacture of cooling towers for every type of service. For complete details on Fluor Cooling Towers, write for the new illustrated bulletin, "Cooling Water for Industry."

CTI

BE SURE WITH

FLUOR

THE FLUOR CORPORATION, LTD.
LOS ANGELES 22, CALIFORNIA

FOREIGN: FACTS FLUOR, PARIS
FLUOR OF CANADA, TORONTO
FLUOR INTERNATIONAL, BEIRUT
FLUOR PERUANA, S.A., LIMA
HEAD WRIGHTSON, LONDON

ENGINEERS
CONSTRUCTORS
MANUFACTURERS

NEW YORK
CHICAGO
PHILADELPHIA
BOSTON
PITTSBURGH
SAN FRANCISCO
HOUSTON
BIRMINGHAM
TULSA

R/M's BIG 7 Packing Types meet 95% of all packing needs

Triplex pumps like this one, which is used to supply hydraulic pressure for molding presses, give top performance with R/M Vee-Flex®, a packing included in Type 7 of R/M's "Big 7" Packing Types.

Let R/M packings reduce your downtime

With R/M's "Big 7" Packing Types you will be able to practice preventive rather than corrective maintenance. With them you will have greater assurance of machinery protection and a chance to schedule your downtime. You will, because this basic line of just seven field-tested packing types is engineered to give custom-built performance in all but the very rarest packing applications. Your plant can probably standardize on just three or four of R/M's "Big 7" Packing Types. If so, this also means lower inventories and simplified ordering. Your R/M distributor has the full details. Call him in and start benefiting right away.

R/M PACKINGS FOR MAINTENANCE PURPOSES ARE SOLD ONLY THROUGH AUTHORIZED R/M DISTRIBUTORS

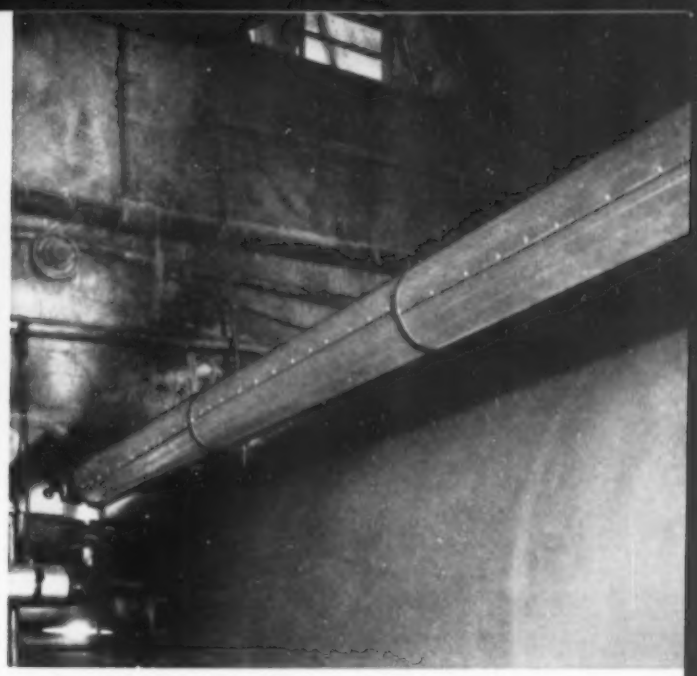
RAYBESTOS-MANHATTAN, INC., PACKING DIVISION, MANHEIM, PA.

BIG 7 PACKINGS

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada.

RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Bowling Balls

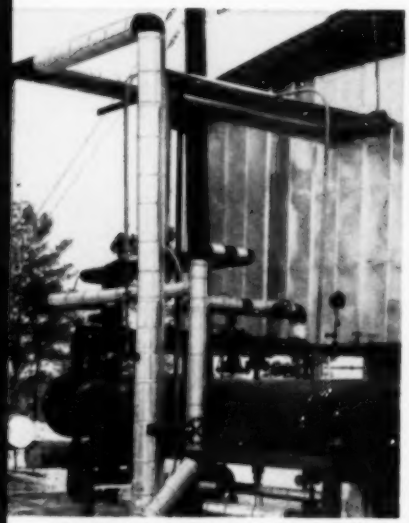
IN PETROLEUM REFINERIES like this a new kind of aluminum jacketing is used to protect the insulation on hot and cold lines. It is known as Childers Aluminum Jacketing and is especially engineered to combine the long life and weather resistance of aluminum with a low first cost. It goes on quick and easy—can be used and re-used. It is made of tough but flexible .006" 35 aluminum alloy, so it handles easily and requires no shop forming.



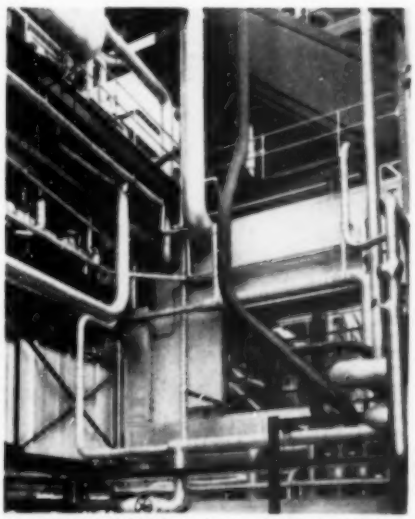
IN CHEMICAL AND PAPER plants: engineers are finding new uses for this easy-to-handle jacketing. Childers Jacketing here is in use at Scott Paper Company's tremendous Chester, Pa., plant. The insulated line passes between fast moving rolls carrying the felt used in paper making both above and below the line. The Aluminum Jacketing protects against paper dust and water, both of which are always present in the manufacture of paper. The jacketing also appreciably diminishes the possibility of the spread of fire which might strike across ordinary canvas jacketing.

Engineered for outdoor lines — new, low-cost aluminum jacketing now used in 567 processing plants

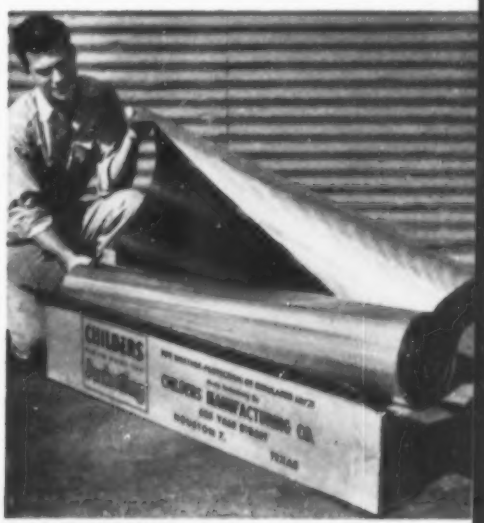
The new kind of aluminum jacketing for insulated lines shown in the pictures on this page is Childers Aluminum Weatherproof Jacketing. Write for samples and full details, no obligation. Childers Manufacturing Co., Dept. SP-6, 3620 W. 11th St., Houston 8, Texas.



IN FOOD PROCESSING plants such as this Minute Maid Corp. unit at Plymouth, Fla., Childers Jacketing is useful for both indoor and outdoor installations. Its clean, shining appearance and ease of washing are extra advantages.

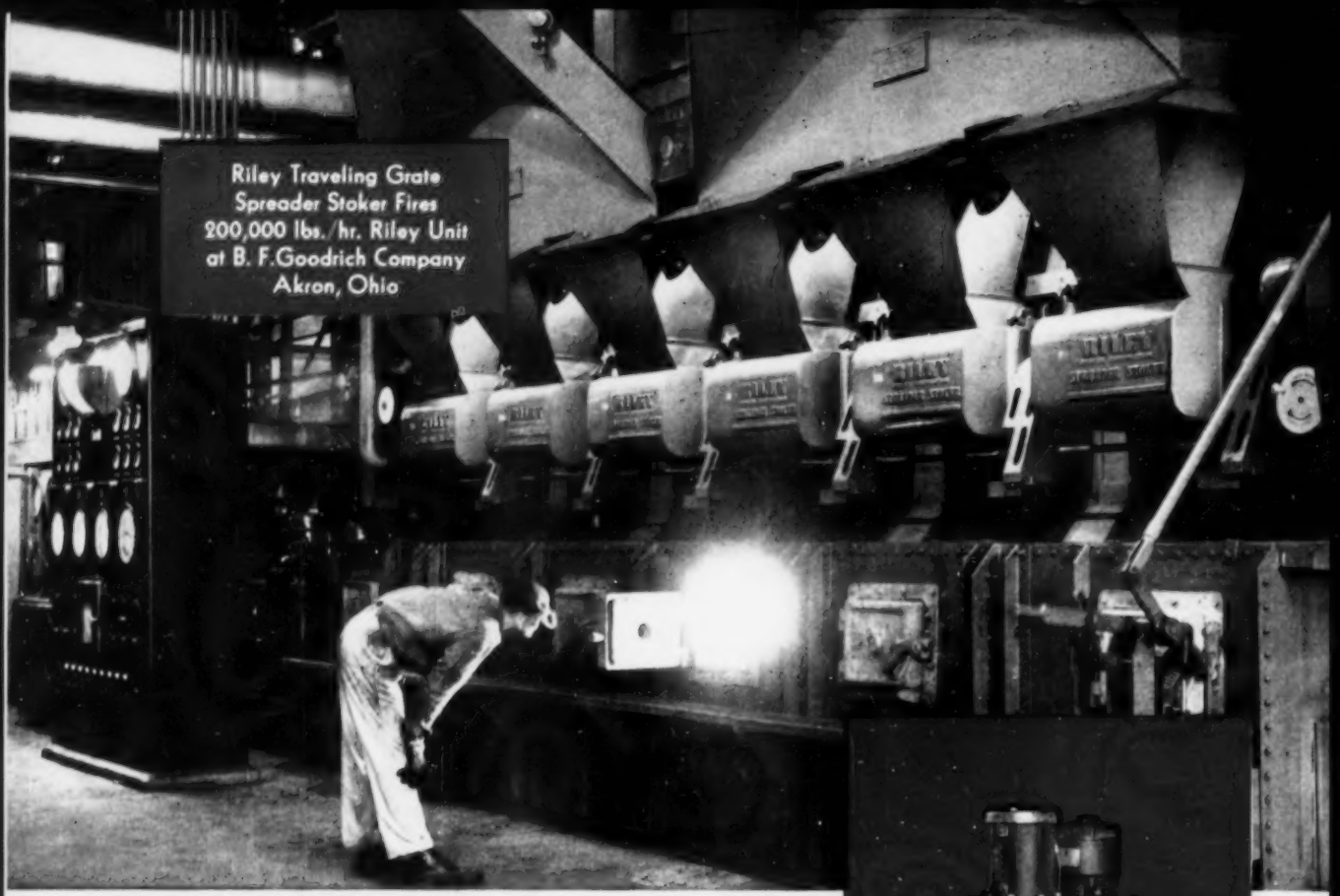


IN POWER PLANTS—indoors and out—Childers Jacketing is an ideal material for protecting insulation. This is a big outdoor installation in the South. This jacketing needs no painting, and the gleaming aluminum surface makes for "good housekeeping" in any utility or institutional power station.

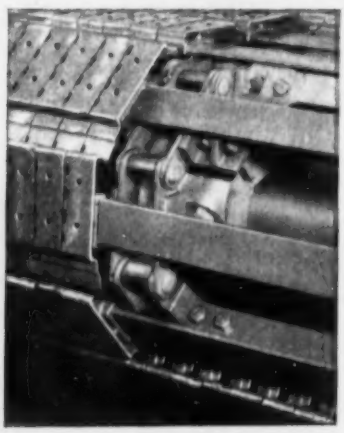


ALMOST ANYWHERE you have insulated lines in your processing plant, consider this specially engineered jacketing. It is flexible, easy-to-handle; yet it has the appearance values and the weather resistance that are inherent in aluminum. Write to address shown above for full details.

Advertisement



Riley Traveling Grate Spreader Stoker Fires 200,000 lbs./hr. Riley Unit at B. F.Goodrich Company Akron, Ohio



GRATE SURFACE

This view of the grate shows the overlapping of special growth resistant alloy clips mounted on structural steel T bars. Note how clips separate to free themselves of ashes and clinkers. Use of small grate clips two inches wide with a six-inch pitch minimizes warping or cracking. Tuyeres in center and at sides of clips provide uniform air distribution.

HYDRAULIC DRIVE

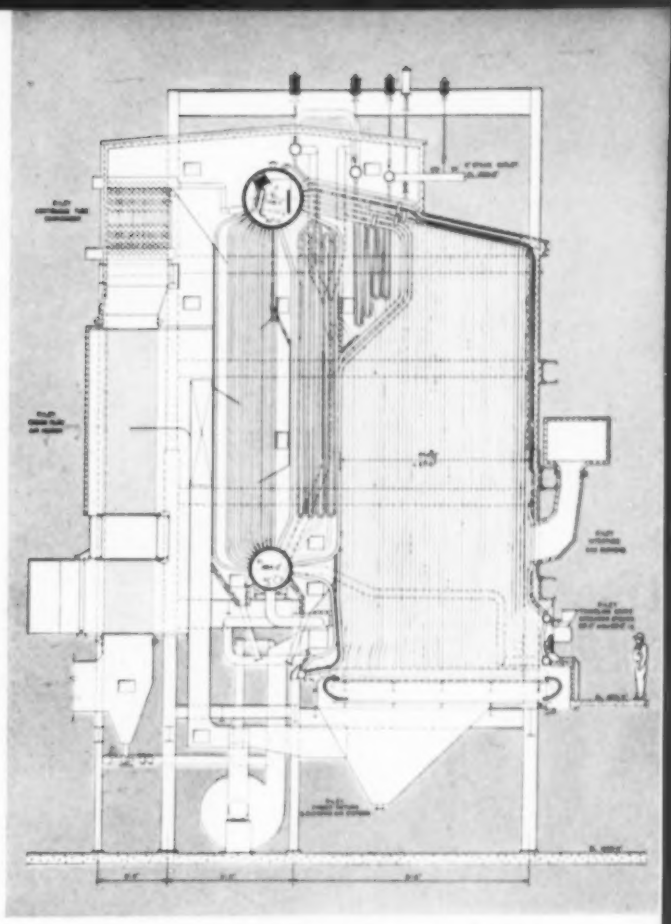
The Riley Grate Drive is a hydraulically driven ratchet drive, completely enclosed and self-lubricated. No sprockets, chains and speed reducers are needed. Hydraulic circuit provides positive overload protection to the grate; Riley Drive provides complete grate speed control from zero to full load. Pressure gauge informs operator of amount of load at all times. Drive operates with low power consumption and with practically no maintenance.

FEEDER DISTRIBUTOR

The Riley Feeder is designed to provide uniform positive feed regardless of coal characteristics and moisture. Avalanching with fine coal does not occur. The Overthrow Distributor provides uniform longitudinal and lateral distribution and prevents damage or outage caused by wedging of foreign materials between distributor and housing.

Here's Proof of RILEY LEADERSHIP in the Spreader Stoker field . . .

. . . many leading public utilities and industrials are installing Riley Traveling Grate Spreader Stoker fired boiler units with steam capacities up to 250,000 lbs. hr.!



When large traveling grate spreader stoker-fired steam-generating units are being considered, many leading public utilities and industrials select Riley equipment. They recognize Riley for its extensive experience in the fuel-burning and steam-generating field. They, as most power engineers, prefer the Riley Traveling Grate Spreader Stoker for the superiority of its Riley-developed Hydraulic Drive and Riley Grate surface, the uniformity of its feed and distribution from the Riley overthrowing distributors, its high day-after-day overall efficiency, continuity of operation and low maintenance.

B. F. Goodrich, Champion Paper & Fibre, Kennecott Copper, Gaylord Container, Montana-Dakota Utilities, Utah-Idaho Sugar have all installed large Riley traveling grate stoker-fired steam-generating units. If you are considering high-capacity spreader stoker-fired units, be sure to call in a Riley engineer. It will pay you to do so.

Montana-Dakota Utilities • Mandan, North Dakota
250,000 lbs. /hr. Riley Steam Generator
26' x 20' Riley Traveling Grate Spreader Stoker

Other Riley Traveling Grate Stoker Installations

Gaylord Container Corp.
Bogalusa, La.
250,000 lbs. /hr. Riley Unit
22' x 20' Riley Traveling Grate Spreader Stoker

Kennecott Copper Company
McGill, Nev.
235,000 lbs. /hr. Riley Unit
28' x 18' Riley Traveling Grate Spreader Stoker

Utah-Idaho Sugar Company
Moses Lake, Wash.
250,000 lbs. /hr. Riley Unit
28' x 19' Riley Traveling Grate Spreader Stoker

Champion Paper & Fibre Company
Canton, N. C.
200,000 lbs. /hr. Riley Unit
24' x 22' Riley Traveling Grate Spreader Stoker

United States Steel Corp.
General Motors Corp.
General Electric Co.
Celanese Corp. of Amer.
General Time Instr. Co.
Iowa Public Service Co.
City of Hastings, Neb.
City of Springfield, Minn.
John Deere & Co.
Penn. Electric Co.
U.S. Gypsum Co.
Swift & Co.
Ohio Edison Co.
Stokely Foods
City of Ames, Iowa
City of Provo, Utah
Monsanto Chemical Co.
Central Ill. Light Co.
Bendix Aviation Co.
Garlock Packing Co.
Armstrong Cork Co.
Pennsylvania R. R.
City of Napoleon, Ohio
City of Troy, Ohio
Iowa-Illinois Gas & Electric Co.
Corn Belt Power Coop., Iowa
E. I. duPont de Nemours Co.
Minnkota Power Coop., N. D.

RILEY STOKER CORPORATION

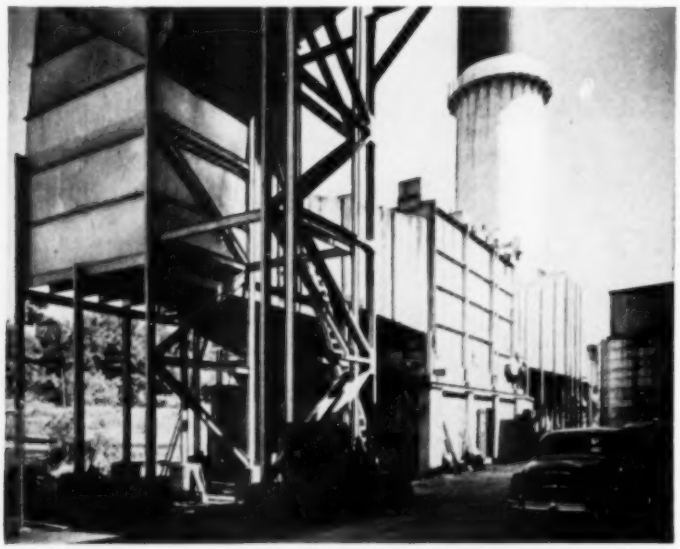
WORCESTER, MASS.

Boston, New York, Philadelphia, Buffalo, Washington, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Tulsa, Houston, Denver, Salt Lake City, Los Angeles, San Francisco, Portland, Seattle

COMPLETE STEAM GENERATING UNITS

BOILERS • PULVERIZERS • BURNERS • STOKERS • SUPERHEATERS • ECONOMIZERS
WATER-COOLED FURNACES • STEEL-CLAD INSULATED SETTINGS • AIR HEATERS

From Pennsylvania to Peru...



Buell Electric Precipitators Set New Dust Collection Records!

Work with equal economy and efficiency on wide range of different and complex dust collection problems . . . from foundry dust and cement to minerals from smelting operations.

Drastically cut maintenance costs. Even better, there's less to maintain because of new, simpler design.

Set new efficiency standards far beyond currently accepted levels. The exclusive Buell Spiralectrode is typical of the advances that make this possible.

Work effectively in combination with other Buell equipment. Many such combinations now operating. The Electric Precipitator with one, two or three stage Buell Cyclones, for example.

● It's impossible to tell the whole story here. That takes your examination of the actual performance information now available. We're skeptics ourselves! That's why we want to meet the most skeptical engineer around . . . we believe we can send him away with a smile! Why settle for less than a good, long look? Write Buell Engineering Company, Dept. 80-E, 70 Pine Street, New York 5, N. Y.

buell®

MECHANICAL ELECTRICAL

20 Years of Engineered Efficiency In
DUST COLLECTION SYSTEMS

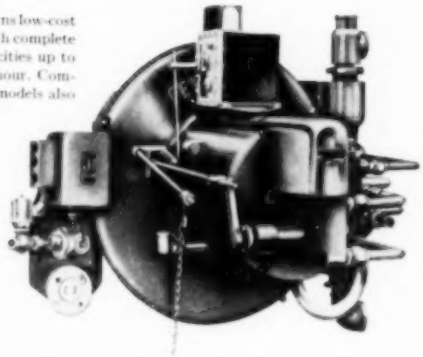
Is inefficient firing stealing dollars from your pocket?

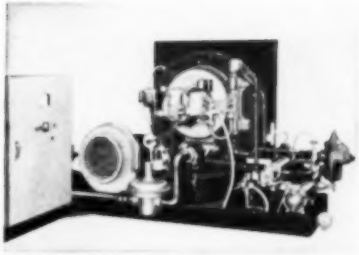
install a

PETRO INDUSTRIAL OIL BURNER

and save 3 ways

Rotary type. Burns low-cost heavy fuel oil with complete reliability. Capacities up to 200 gallons per hour. Combination oil-gas models also available.





Petro "Packaged Unit" (for oil or gas or both). A complete combustion system in which all elements are correctly balanced and integrated. Simply bolt to boiler front and make service connections and it's ready to go.

1. Fire low-cost oils

Petro fires the heavy fuel oils (Nos. 5 and 6) which average 8% richer in heat value than the light burner oils, and cost less per gallon.

2. Save fuel and labor

They efficiently fire heavy oils with complete dependability, following load changes automatically. This makes fuel go farther and saves labor.

3. Low maintenance cost

They are sturdily built and thoroughly reliable. This means low maintenance costs.

There's a Petro burner to fit almost every boiler, in sizes from 11 to 200 gallons per hour.

Heating contractors everywhere recommend and install Petro oil equipment. For illustrated catalog write Petro, 3031 West 106th St., Cleveland 11, Ohio.

In Canada, write 2231 Bloor St., West, Toronto, Ontario.

Residential Oil and Gas Burners, Oil and Gas Furnaces and Boilers, Industrial and Commercial Oil, Gas and Oil-Gas Combination Burners

PETRO

T.M. REG. U.S. PAT. OFF.

Over 50 Years of Leadership in Automatic Heating and Power Equipment

Send for free catalog today . . .

see our catalog in 9 ARCHITECTURAL FILE or write for copy

Divining Rod . . . Southern Style!

THE HIGHBROW NAME for this scientific water locating device is "Earth Resistivity Instrument." But to our industrial geologist and his men in the field it's just plain "Megger"—the divining rod with a college education.

Using the "Megger" and other modern equipment, our water-location team is charting areas along the Southern where heavy supplies of *underground* water for industrial use may be found, the anticipated yield and the quality.

An unusual way to railroad? Not at all—for factual information of this kind is vitally important to many industries considering a location in the South. And by making it readily available to them, we are helping the territory we serve to grow and prosper.

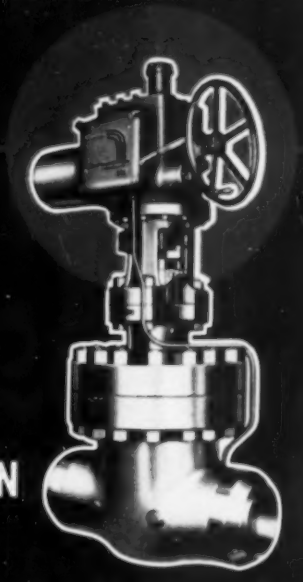
This is another of the little-known but important ways in which the Southern "serves the South."

Harry A. DeButts
President

THE SOUTHERN SR SERVES THE SOUTH

SOUTHERN RAILWAY SYSTEM

WASHINGTON, D. C.

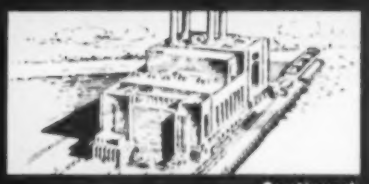


DEPENDABLE, SAFE AUTOMATIC OPERATION

. . . keeps power plants sold on *Limitorque*

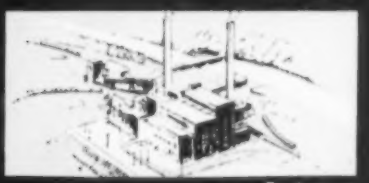
NEW OR EXPANDED PHILADELPHIA ELECTRIC POWER PLANTS

Cromby

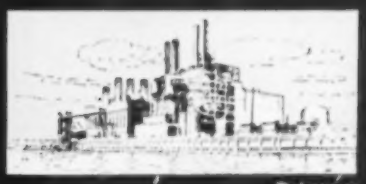


Southwark

Richmond



Barbadoes

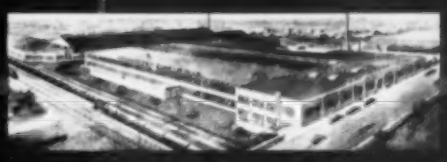


Delaware

PHILADELPHIA ELECTRIC COMPANY, one of America's Great Public Utility Organizations, has installed a total of 347 LimiTorque Motorized Valve Operators in seven of their famous Power Stations (5 of which are illustrated herewith).

LimiTorque Valve Controls were chosen for their absolute dependability; speed of operation; saving in man-hours; out-of-the-way or hazardous location of valves;—and of course, for their automatic, positive remote operation by the "mere push of a button". What's more, LimiTorque absolutely prevents damage to valve stems, seats, discs, plugs or gates, . . . because the power is cut-off automatically should an obstruction be encountered in closing.

Thousands of LimiTorque Valve Operators are used in many prominent Central Stations; Power Plants; Water & Sewage Plants; Oil Refineries and Pipe Lines; Paper & Pulp Mills, and on Shipboard. Remember, far more LimiTorques are in use today, than any other make of Valve Operator. If you have a valve operating problem,—write us—and a Philadelphia Engineer will gladly call. Literature sent upon request.



PHILADELPHIA GEAR WORKS, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

Industrial Gears & Speed Reducers

LimiTorque Valve Controls

cancer

man's cruelest enemy strike back

"CANCER" is an unpleasant word. It's easier not to think about it—to turn the page, to pass on.

MOST FOLKS who see this ad, will do just that . . .

YOU ARE DIFFERENT. The fact that you're still reading this proves it.

PERHAPS you have a special reason of your own for being interested in the fight *against* cancer. Cancer may have taken away someone whom you loved. It's not unlikely, for cancer strikes one out of five of us. The young. The old. The strong no less than the weak.

LAST YEAR, Americans contributed more than ever before to the American Cancer Society. But still not enough. Not nearly enough for the struggle that *must* be waged if this implacable enemy is to be conquered for good —if we are to make cancer, like so many once-dreaded diseases, only an unpleasant *memory* in man's long and victorious struggle against his ancient enemies.

THIS YEAR—please—give more generously than ever. For your help is *needed* more than ever. Won't you please clip the coupon *now—?*

American Cancer Society

GENTLEMEN:

☐ Please send me free information on cancer.

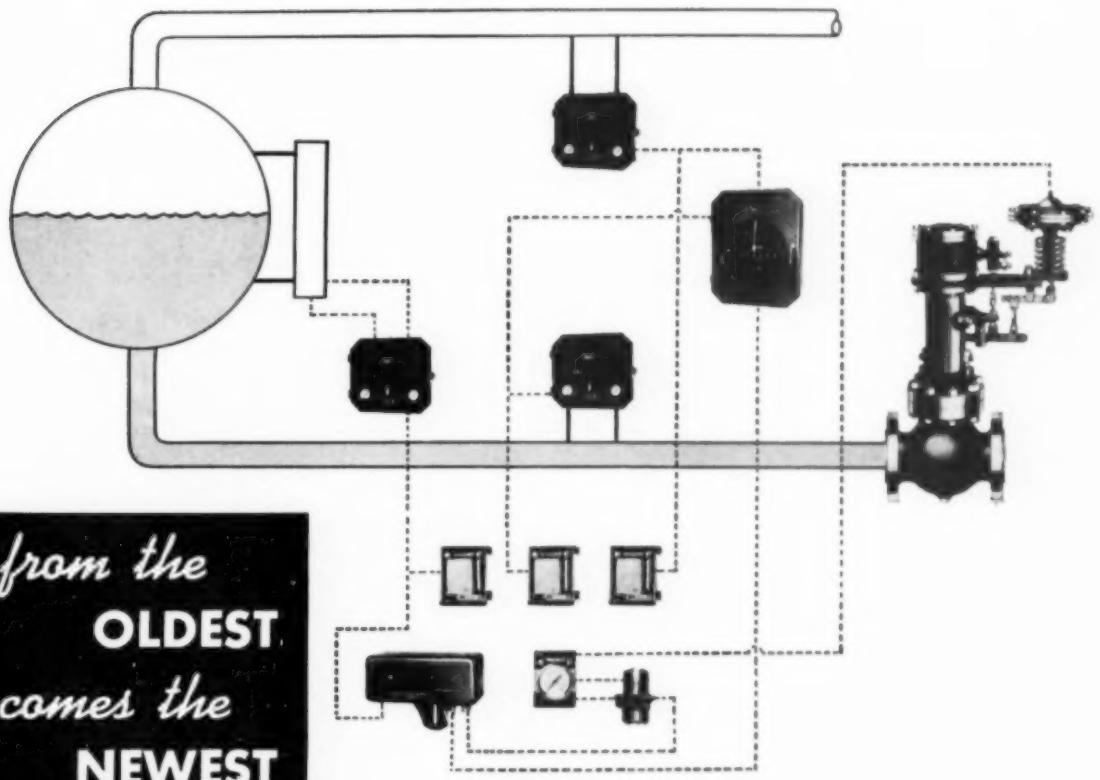
☐ Enclosed is my contribution of $..... to the cancer crusade.

NAME.....

ADDRESS.....

CITY..... STATE.....

Simply address the envelope:
CANCER c/o Postmaster, Name of Your Town



from the **OLDEST** *comes the* **NEWEST**

IN THREE-INFLUENCE BOILER FEED WATER CONTROL

Type 3-L with instrumentation by Taylor

COPES . . . the oldest name in boiler feed water regulation . . . now offers you the newest in three-influence feed water control. Combined in the new COPES Type 3-L are . . .

. . . the scientific balance, characterized ports and rugged dependability of the COPES control valve.

. . . plus the unequalled responsiveness and accuracy of *instrumentation by Taylor.*

And Copes-Vulcan assumes undivided responsibility for service, whenever or wherever needed . . . throughout the life of the installation.

Write for Bulletin 1013. It tells the story of the newest feed water control to come from COPES . . . the oldest name in boiler feed water regulation.

COPES-VULCAN DIVISION
CONTINENTAL FOUNDRY & MACHINE COMPANY
ERIE 4, PENNSYLVANIA

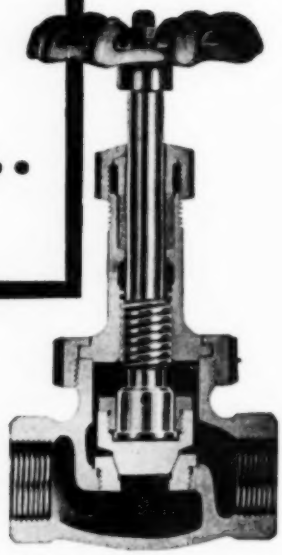
COPES VULCAN

BOILER CONTROL

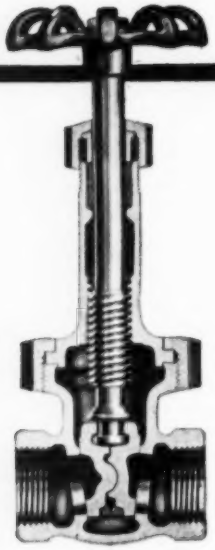
Three-influence mechanically-operated and three-influence electrically-operated regulators are also available.

WITH INSTRUMENTATION BY *Taylor*

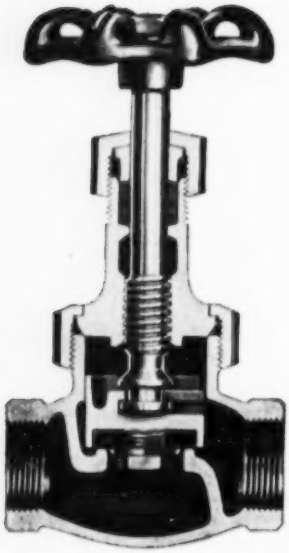
Walworth bronze valves...



Walworth No. 225P Globe Valve
500 Brinell Seat and Disc



Walworth
No. 29 Gate Valve



Walworth No. 95 Globe Valve
Re-New-Disc

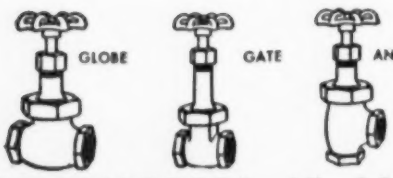
built to give dependable trouble-free service on all recommended jobs

Walworth No. 95 Bronze Globe Valves (Angle Type: No. 96) are recommended for service where throttling is not required. They are rated at 150 psi working steam pressure, 500F; 300 psi cold water, oil or gas. The improved renewable disc and lock-on, slip-off disc holder — an original Walworth development—saves time and trouble. This valve can be repacked under pressure when fully opened. All parts are designed to give maximum service and strength.

Walworth No. 29 Bronze Gate Valves are rated at 200 psi working steam pressure, 550F; 400 psi cold water, oil and gas. These valves have rising stems and integral seats. Sizes 2-inch and smaller have union bonnets; sizes 2½ and 3-inch have bolted bonnets. Valves up to and including ¾-inch have solid wedge discs; 1-inch and larger have split wedge discs. These valves can be repacked under pressure when fully opened.

Walworth No. 225P Bronze Globe Valves (Angle Type: No. 227P) are rated at 350 psi working steam pressure, 550F; and 1000 psi non-shock service on cold water, oil and gas. The stainless steel, plug type seat and disc — heat treated to 500 Brinell — can be closed on sand, slag, scale and similar floatage, without injury to the seating surfaces. They are the longest wearing, TOUGHEST bronze valves you can buy.

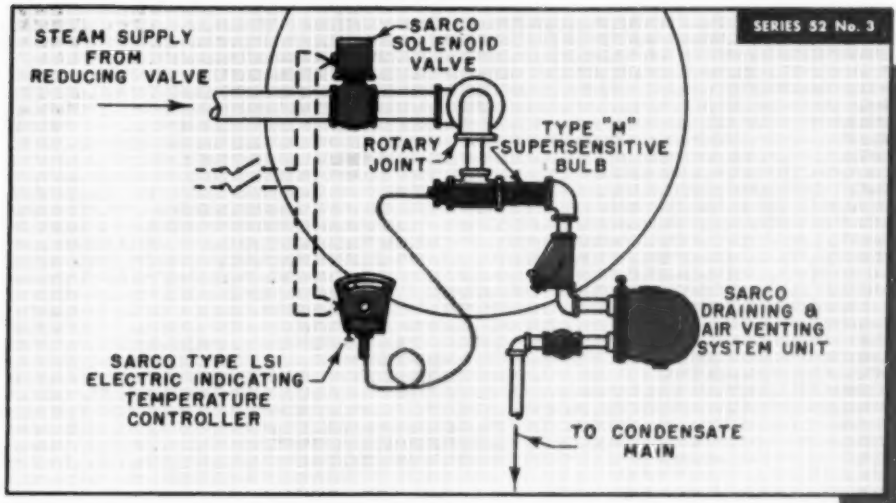
For full information about Walworth Quality Bronze Valves, see your Walworth distributor, or write:

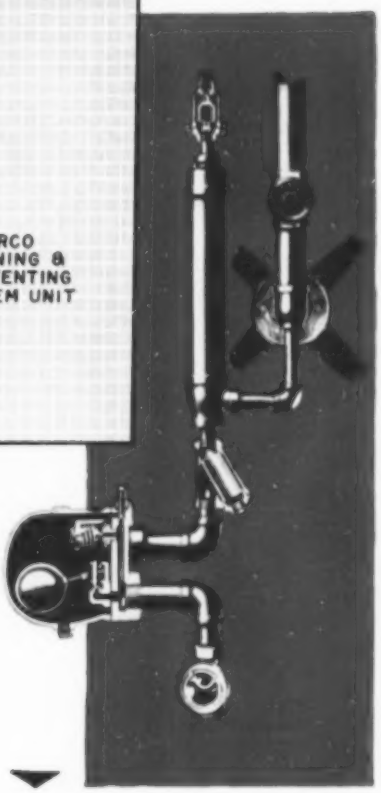


WALWORTH
valves and fittings
60 EAST 42nd STREET NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

This sketch shows temperature control applied to a Sarco Draining System for drying cylinders. The Sarco System assures rapid and continuous removal of condensate. The steam supply is controlled in accordance with load requirements.


SERIES 52 No. 3
STEAM SUPPLY FROM REDUCING VALVE
SARCO SOLENOID VALVE
ROTARY JOINT
TYPE "H" SUPERSENSITIVE BULB
SARCO DRAINING & AIR VENTING SYSTEM UNIT
SARCO TYPE LSI ELECTRIC INDICATING TEMPERATURE CONTROLLER
TO CONDENSATE MAIN



more production

from DRYING CYLINDERS and ROTARY DRYERS

The standard Sarco Draining and Air Venting System consists of a special float-thermostatic steam trap equipped with *steam lock release* and thermostatic air vent; an air collector pipe with an air vent on top; a strainer and a flow indicator.

IF YOUR DRYING OPERATIONS include steam heated drying cylinders or rotary dryers, this story is of vital interest to you!

More than one hundred actual installations made in the last two years in the textile, chemical and paper industries have demonstrated that:

- *Warming-up time can be cut 10-25%*
- *Production can be increased 15% or more*
- *Considerable steam can be saved at the same time by installing the*

Sarco Draining and Air Venting System

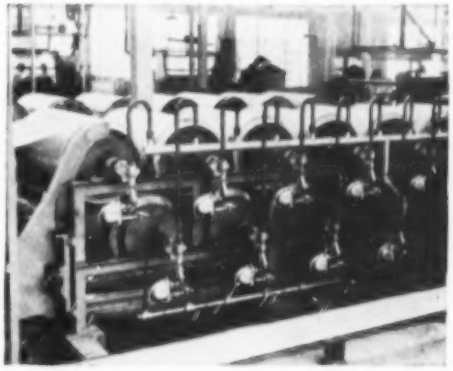
This System has finally solved the vexing problem of traps locked by steam in the syphon pipes and discharge joints from the cylinder to the steam trap.

Continuous discharge of condensate as fast as formed, plus very rapid purging of air assure more evenly heated drying surfaces—with less steam consumption.

Write for the Technical Bulletins for your industry.

SARCO COMPANY, INC.
Empire State Bldg., New York 1, N. Y.
REPRESENTED IN PRINCIPAL CITIES
Sarco Canada Ltd., Toronto 8, Ont.

SARCO STEAM ENGINEERING
improves product quality and output



Special Sarco Float-Thermostatic Steam Traps equipped with *steam lock release* and sight glass as used on drying cylinders and rotary dryers in the textile, chemical and paper industries.

401

"All day I watch the coal go by!"

"Train after train. Day and night. Year after year. You wonder where it all comes from and how long it can last."

• • • • • • • • •

You're right, Pop, it's a lot of coal—close to half a billion tons a year. Yet, in the more than a century this country has been mining coal, we have used up only a little over one percent of our known supply. 98.8% of the coal that nature put under our soil is still there for future generations.

That is something to think about when you are considering a new heating plant for home or industry. Other fuels will be getting scarce. Every year the wells go deeper. More and more of our fuel oil comes from foreign fields. Growing scarcity can mean uncertain supply and higher relative prices.

Coal you can be sure of. There will be a plentiful supply for many centuries to come. And the price advantage that makes coal a most economical fuel today is likely to grow with every passing year.

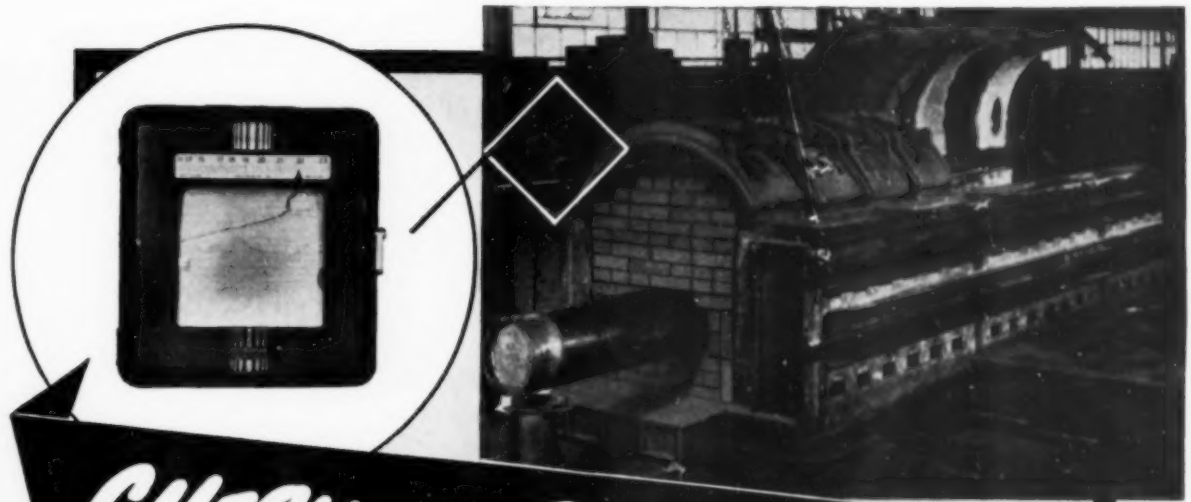
COAL
FUEL OF THE FUTURE

Chesapeake and Ohio Railway

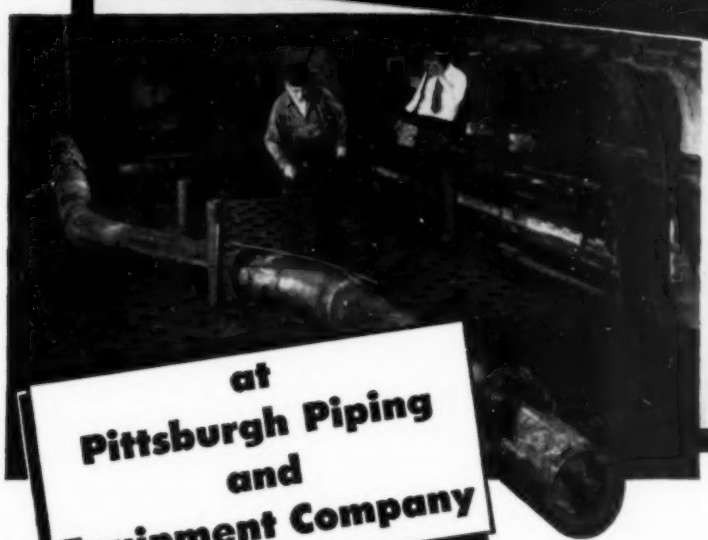
Bring your fuel problems to C&O

As the world's largest carrier of bituminous coal, the C&O is intimately familiar with every phase of coal use. We have a large staff of experts who will gladly help you to locate the coal best suited to your needs; to help you use it most efficiently; to help get it to you promptly.

Write to:
Coal Traffic Department
Chesapeake and Ohio Railway
2112 Terminal Tower
Cleveland 1, Ohio



CHECK and DOUBLE CHECK



at Pittsburgh Piping and Equipment Company

on HEAT TREATING and BENDING TEMPERATURES

The temperature to which P.P.&E. piping is subjected before bending is measured by a Ray-o-Tube which projects through the furnace wall . . . and recorded on the chart of the Micromax instrument.

This time-temperature record makes practicable precise control of conditions so that each section of pipe is heated in conformance with a predetermined routine which assures consistent physical and mechanical properties.

After the pipe is taken from the furnace, it is immediately placed on a bending table, and during the bending process its temperature is periodically checked with an optical pyrometer by a trained, experienced observer.

You can depend on Pittsburgh Piping and Equipment Company for leadership in methods that assure greatest safety, highest efficiency, and longest service from high temperature, high pressure piping.

Pittsburgh Piping AND EQUIPMENT COMPANY

10 Forty-Third Street — Pittsburgh, Penna.

Atlanta	Whitehead Building	Cleveland	Public Square Building
Boston	10 High Street	Houston	Heights State Bank Bldg.
Charlotte	221 Builders Building	Los Angeles	1830 N. Alexandria Ave.
Chicago	Peoples Gas Building	New Orleans	P. O. Box 74
New York	Woolworth Building		

PP-1

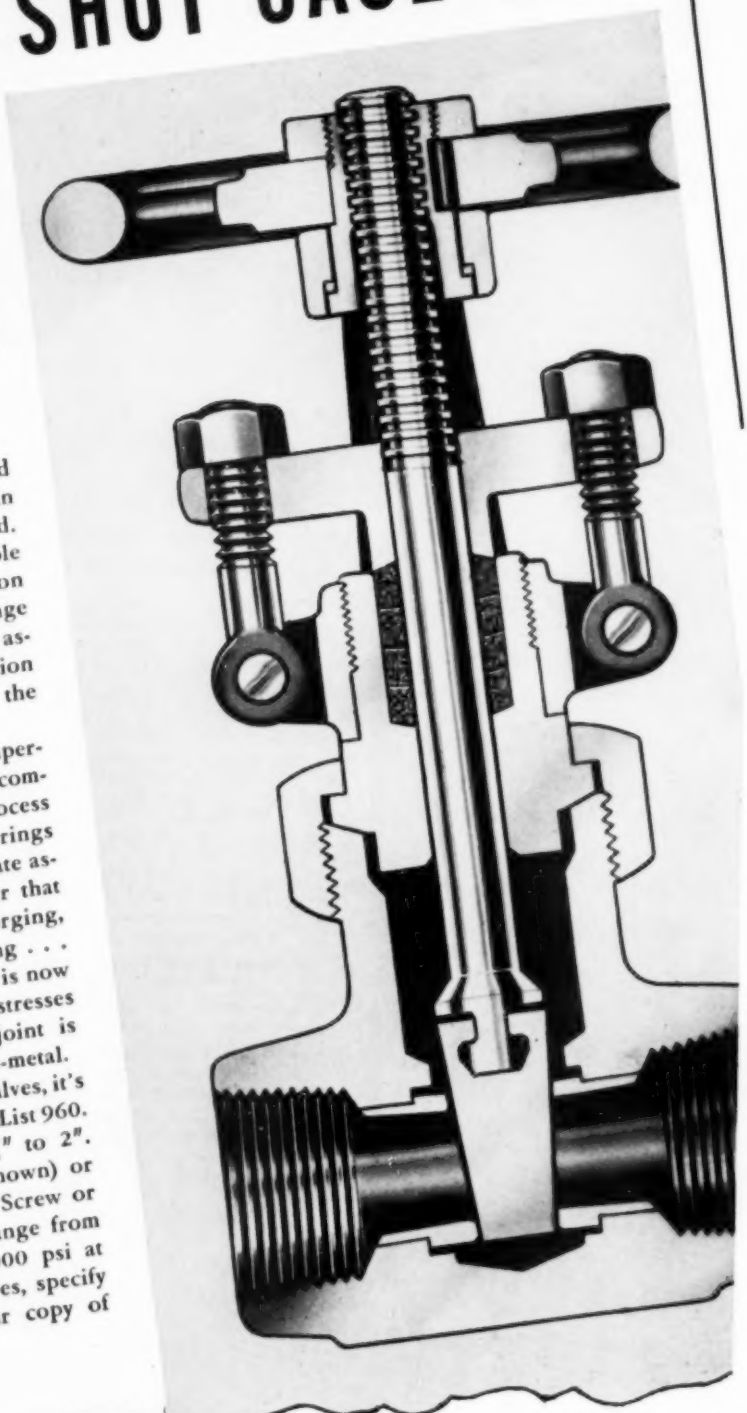
OPEN AND SHUT CASE FOR CHAPMAN LIST 960

Small Forged Steel Gate Valves

Chapman List 960 is used for more different jobs than any other valve of its kind. And no wonder: its simple and rugged construction means reliability over its wide range . . . super-hardened gate and seats assure tight closure, smooth operation and low maintenance under the toughest conditions.

Here's why: gate faces are super-hardened to 800 Brinell by Malcomizing, Chapman's exclusive process . . . hardened stainless steel seat rings are replaceable . . . stem-and-gate assembly has a tapered shoulder that seats snug in the bonnet forging, permits full-pressure repacking . . . the stem-and-gate connection is now 50% stronger where high stresses can develop . . . bonnet joint is gasketed or ground metal-to-metal.

For big savings on small valves, it's a winning case for Chapman List 960. Available in sizes from ¼" to 2". Rising stem, with yoke (shown) or inside screw, rising stem. Screw or welding ends. Pressure range from 380 psi at 1000°F to 2000 psi at 100°F. For higher pressures, specify List 990. Write for your copy of Catalog 10 now.



The **CHAPMAN VALVE**
MANUFACTURING COMPANY
Indian Orchard, Mass.

Timely Comments

Exercise Care on "THE NEXT SIZE BIGGER"

VERY SELDOM indeed does the competent maintenance man purchase anything *too small*. He wants his slings and hoists and motors and pumps and piping big enough to do the job without a struggle. So if any error is made, it is likely to be on the *too big* side.

Engineers and designers are normally less subject to *bigitis* than maintenance men because:

1—They are more aware of the efficiency factor than repair men.

2—They are not personally so familiar with the results of breakdowns and failures as the man who has to bring order out of wreckage.

So it is natural that the two points of view should be different—even in conflict sometimes.

But regardless of how natural it is for the engineer and repair man to differ in their opinion of proper size for equipment, these differences must be reconciled in the well managed, efficient plant.

There is a correct, or most desirable size or capacity for each item of equipment and any appreciable error in that choice is likely to be hazardous on the one hand, or expensive on the other.

This all brings up again the ever present need for the maintenance man to exercise GOOD JUDGMENT. Frequently he has reason to deviate from original plant specifications when making replacements, but when it comes to changing size or capacity he should always exercise care to see that losses do not exceed advantages if he goes to "the next size bigger."

There are many instances where oversize or over capacity is genuinely objectionable—without even considering the higher price of the larger item:

1—Motors, generators, engines, pumps, and fans practically always give highest efficiency at some point between three-fourths and full load.

2—Power factor is highest with induction motors operating near full load.

3—Reducing and regulating valves perform best when operating at or near rating.

4—Some filters may not do their job well at all unless operated at capacity.

5—Boilers and turbines are extremely wasteful at low loads.

Every good mechanic recognizes the need for right size of tools. No one would choose a 24" pipe wrench for connecting small pipe. But when it comes to motors, fuses, valves, etc., discretion is frequently thrown to the wind, and the maintenance man specifies the biggest thing he thinks the purchasing agent will buy.

Why? Because a repairman hates breakdowns for one reason, but that is not all. He also knows the production department's tendency toward overloading existing equipment. He wants to get ahead of those guys for once and put in something big enough to hold 'em for a while.

Team work—A smooth running, efficient plant must be well balanced. Each department, and each item of equipment must be matched to its job. And to keep it that way, management, engineers, and maintenance heads must work together—no secrets, no fudging, and no desire to blame the other fellow when things go wrong.

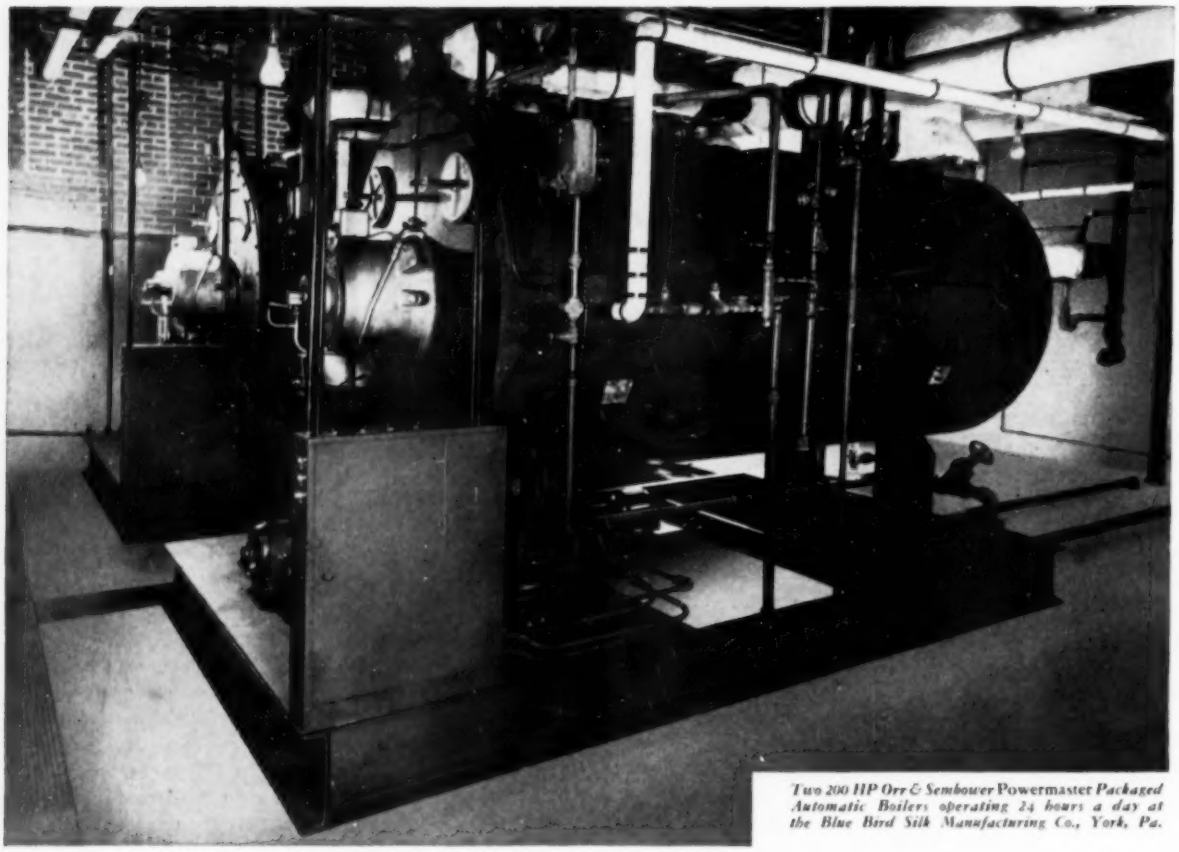
Many times a good maintenance man wishes he were wiser, better educated, and more experienced. But at the same time he realizes that to gain full knowledge of all the problems he must encounter would take more than one lifetime.

So, he relies heavily on the GOOD JUDGMENT mentioned above. He must decide when to stop and check up, and when to go ahead. He tries to avoid "blind action," by finding out the facts on new types of work. He respects the opinions of others, but he moves not until he is fully convinced.

WITH THIS—SP&I's 8th Annual Plant Maintenance Issue—maintenance engineers throughout the South and Southwest report on plant-tested ideas, methods and kinks that may find application in your plant.

Only a short time is required to check and investigate their methods. We believe the time will be well spent.

IN TEXTILE MILLS...



Two 200 HP Orr & Sembower Powermaster *Packaged Automatic Boilers operating 24 hours a day at the Blue Bird Silk Manufacturing Co., York, Pa.*

Powermaster® Performance Pays Off

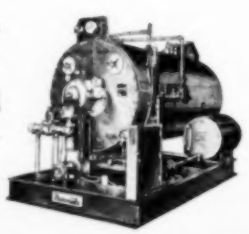
STEAM COSTS DOWN 20% — negligible maintenance. That's the two-year performance record of these two *Powermaster* Packaged Automatic Boilers operating round-the-clock at the Blue Bird Silk Manufacturing Company, York, Pa.

In addition to the cost-saving advantages, these units provide dryer, higher quality steam for processing and heating than the coal-fired boiler they replaced. Burning No. 6 Bunker C oil, they produce 13,800 pounds of steam per hour. And *Powermaster's* Voriflow burner design assures top straight line efficiency when operating between 30% and 100% of capacity.

Check these reasons why *Powermaster* is today's best buy for textile mills, schools, hospitals, industrial plants and all types of buildings: Cost-saving installation, space-saving compactness, dependability, fast steaming, hospital-clean operation, maintenance-saving accessibility, fully automatic operating and safety controls and smokeless combustion.

Find out why satisfied users all over America are saying, "Steam costs go down where *Powermasters* go in". Send for latest descriptive bulletin.

O&S *Powermaster*®
PACKAGED AUTOMATIC BOILERS
In sizes to 500 HP; pressures to 250 psi.



ORR & SEMBOWER, INC. • Established 1885 • **Morgantown Road, Reading, Penna.**

Industry Speaks

Planned Overhauls—Key To Productive Maintenance

Adapted from **Scheduled Maintenance for High Level Production**, a talk by **S. G. Dinkel**, engineer, Apparatus Division, **General Electric Co.**, New Orleans, La. Discussion was presented at the recent **New Orleans Industrial Productivity Forum**, sponsored by Louisiana Power & Light Company, New Orleans Public Service Inc., and the General Electric Company.

Scheduled short-time overhauls consume far less time than the breakdowns they minimize.

"PLANNED overhaul is the big brother of Routine Maintenance and is intended to prolong the life of machines and equipment and keep them in proper operating condition. The two programs go hand in hand and cannot be separated if proper maintenance is your goal."

In his address, Mr. Dinkel then assumed that a well organized "Routine Maintenance" program is being followed in the plant. Such a program would include:

Adequate Maintenance Budget—Sufficient to face up to the facts of the situation. Should provide for an adequate staff of trained maintenance men, armed with efficient, up-to-date tools and test instruments.

Equipment Record System—Provides "machine biographies" to guide workers in carrying out, on a planned basis, such jobs as periodic inspection, routine cleaning, etc.

Equipment's Condition—Determine what each machine needs to assure continued production. Check-up would include a visual inspection, plus study of facts like age, expected life, severity of duty, and past record.

Stocks of Renewal Parts—Accumulating, as far as possible in advance, stocks of needed parts for every emergency, and keeping them replenished at all times.

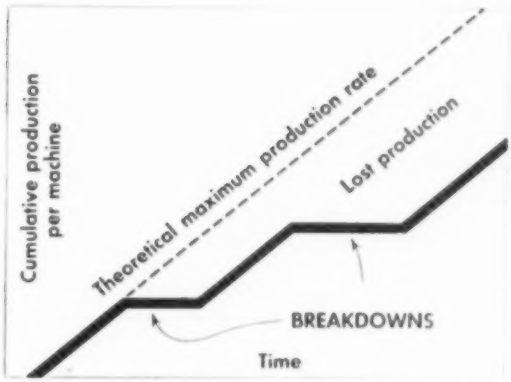
Planned Overhauls—Undertaken only after the production needs of all departments in the plant have been studied. The maintenance superintendent, in consultation with all production groups, can plan outages for individual machines as far as a year in advance, for greater efficiency.

In his New Orleans' address, Mr. Dinkel then emphasized that it is often difficult to predict what machine should be overhauled to prevent breakdowns.

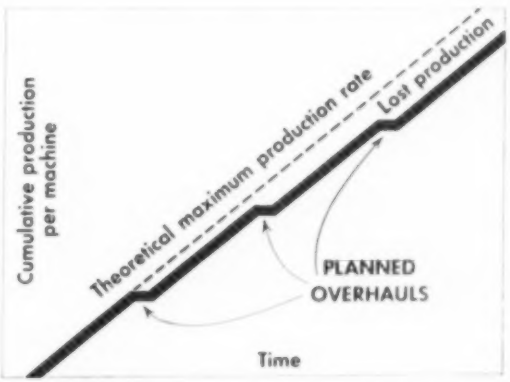
"Visual and electrical inspections and tests of machine windings cannot determine the condition of the inaccessible windings. A machine kept religiously clean, the windings periodically varnished and given good routine maintenance is still subject to turn-to-turn short circuiting of the conductors.

"Then, on what basis should we establish our

(Continued on page 76)



OUTPUT of a typical piece of machinery in your plant. Theoretical maximum production capacity of the machine is plotted against the actual production results for a certain period of time. Note the amount of lost production due to breakdowns.



PRODUCTION gained by the long range planning of overhauls. "Planned Overhaul" includes the rebuilding, reconditioning, and modernization beyond the scope of "Routine Maintenance."

Wherever steam and water flow . . .

Remove Scale With Chemicals

By J. P. WARREN,

Power Consultant,
The Dow Chemical Company, Texas Division, Freeport, Texas

Chemical cleaning for boilers, condensers and heat exchangers is rapidly becoming standard practice. This deposit and scale removal method results in cleaner surfaces, shorter outages and reduced costs.

AT THE Texas Division of The Dow Chemical Company there are now three power plants with a total rated capacity of approximately 500,000 kw in which chemical removal of scale is standard practice, regularly scheduled, resulting in proven savings in outage time for equipment, as saving in maintenance costs and improved efficiencies.

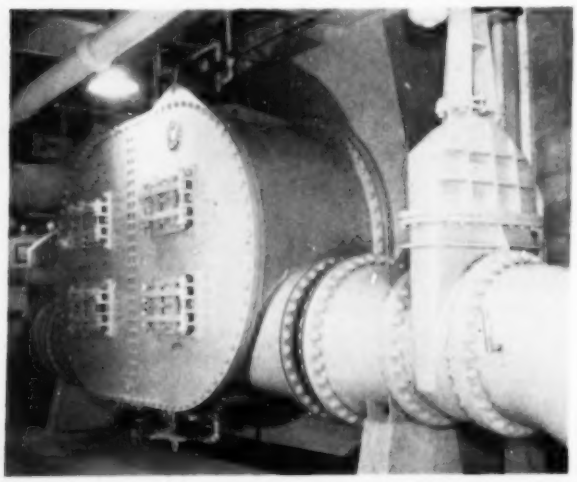
Use of chemical cleaning has been extended to water lines, water jackets, tanks, and filters. In 1944, *J. S. Rush* and *W. S. Jennings* of Dow Chemical discussed chemical removal of scale in the *Petroleum Refiner*. However, wider and more varied application of the chemical cleaning program has been carried on from 1944 to date.

Cooling water for the three power plants is drawn from the Gulf of Mexico and is heavily laden with microscopic organisms. Chlorination is provided to maintain a residual of from .5 to 1.0 ppm to deslime tubes and water boxes; however, the chlorination of this water will not remove the hard scale deposit, mud or silt. Similar conditions prevail in all condensers.

Chemical cleaning effectively removes the iron bacteria and scale from water boxes laid down by salt water corrosion and scale on graphitized cast iron water boxes. The graphitization problem has been eliminated by the use of magnesium anodes and more data on this effective protection will be further developed in another article. Suffice to say at this time that both chemical cleaning and cathodic protection with magnesium anodes have been a great aid to plant operators and have saved both time and money in power plants.

Recently two 55,000 barrel fuel oil tanks were cleaned of oil, mill scale and corrosion products to prepare the internal surface for storing bulk chemicals.

In one of the power plants, six low pressure boilers are used as evaporators with all treated water and some contaminated condensate being pumped to these boilers. The condensed steam from these boilers



CONDENSERS are cleaned on the water side to remove scale, iron bacteria and any adherent marine growth. This improves the coefficient of heat transfer of a dirty condenser from approximately 450 Btu/hr/deg F difference in temperature, per sq ft, to approximately 664 Btu after acid cleaning.

Tests for comparison were run with machine loadings varying between 85% and 105% of rating. When cleaning condensers with divided water boxes, load reductions are made in line with suitable condenser performance. In most cases, load reduction would average 20%.

In a few instances, the steam sides of condenser tubes have been chemically cleaned, resulting in improvement in condenser performance which justified the expense. Condenser installation illustrated is the divided water box type.

is returned to a separate storage for high pressure boiler feed which serves the 1250 psi, 900 F boilers. Chemical cleaning these low pressure boilers has been followed with success leaving cleaner surfaces, reducing outage time and decreasing costs for hand hole gasket renewals and labor.

The sure and satisfactory method for cleaning superheaters here is the chemical cleaning process which does the job of removing deposited boiler water salts from bends in pendant type superheater elements.

New boilers are cleaned of grease and mill scale, acidized and boiled out then, following operations at regular periods, all high pressure, 1250 psi, boilers and superheaters are chemically cleaned. The acid cleaning process has become so dependable that we now have 10 large boiler units, totaling 4,500,000 lb per hour capacity, which have economizers so designed that only acid cleaning can be used.

Versatile Method

Other applications of chemical cleaning of power plant equipment have been equally successful. The water jackets on air compressors, inter- and after-coolers regularly cleaned by this method increased the service hours for large air compressor installations in the plants.

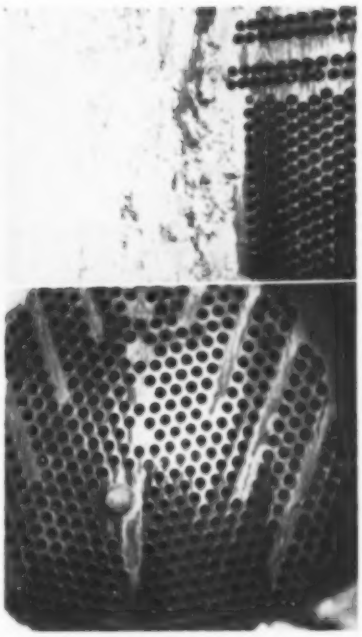
Improved efficiencies in the case of U or hair pin tubes in generator air coolers, better performance of the straight through tubes in hydrogen coolers where scale forming cooling water is used has resulted from chemical cleaning.

The inhibitors used by the chemical cleaning processes of Dowell Incorporated, leaves all metal surfaces in satisfactory condition and with no evidence of metal removal or attack. Oil coolers are cleaned on both oil and water sides by them with less outage time and better heat transfer conditions resulting.

This same method has been used to remove accumulations from anthrafilt filter beds of hot process water treating plants where back washing and mechanical methods failed to properly clean or were too slow and expensive.

Pipelines supplying salt water for cooling are cleaned by the chemical process and the saving by cleaning small branch lines has been economical as well as successful. Experience over the past ten years brought about certain changes in pipeline design to facilitate application of the chemical cleaning process. Improvement of sectionalization of lines, taps and drains for chemical treatment are provided to speed up and simplify this type of cleaning. This one feature has, in some cases, so reduced the equipment and men the contractor had tied up on these jobs that they saved themselves, and us, money over previous jobs that were not so equipped.

CHEMICAL CLEANING and cathodic protection (note magnesium anodes installed in condenser water box) have been a great aid to plant operators and have saved both time and money.

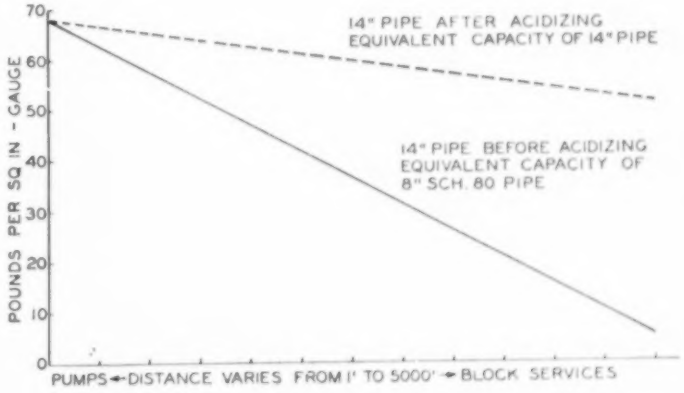


ACCUMULATION of iron bacteria and scale (photo at top right) on the water box of a condenser, was removed by chemical cleaning. Photo at the right shows part of a condenser tube sheet following an acid cleaning job.

Specialists Employed

With approximately 398,000 sq ft of condenser surface in the power plants, one might reason that there would be enough cleaning here to justify doing the job with our own crew. However, since we provide permanent connections to introduce acid or other chemicals, and drains

(*Continued on page* 104)



SALT WATER PIPELINES

Acid cleaning of approximately 12,000 ft of salt water pipelines was described by W. R. Hale of the Dow Chemical Company in SP&I for May, 1948. He reported cleaning a length of 5,000 ft of 14 in. pipe which had been reduced to the equivalent of an 8 in. pipe by accumulations of iron bacteria. Test graph following the chemical cleaning job is shown.

Tools, equipment and system for handling the maintenance job . . .

INSTRUMENTS and CONTROLS

PLANT engineering personnel concerned with the use of the many types of industrial instruments have seen a tremendous growth in the utilization of automatic controls. When machinery is being designed to implement a process it is now necessary to include study of available instruments in order to provide the utmost in accuracy of measurement and control. We have found, in many cases, ways to adapt instruments to particular parts of process operations and we'll find more.

We all are after one thing—the lowest cost operation consistent with high quality. The basic function of instruments is to control operations, or supply information to an operator, which assures the most efficient performance of a piece of equipment. Any device that fills that specification has taken us a long way toward our objective.

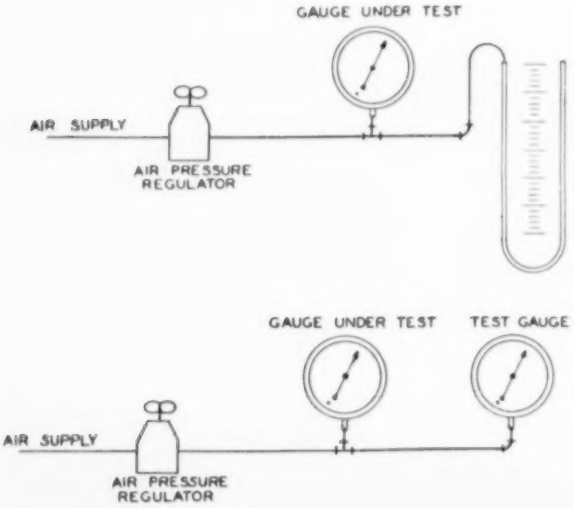
The first step toward utilization of these valuable aids is the discarding of the idea that instruments are expensive toys, or else practical only for those tremendous and expensive operations of our major industries. They are used to advantage in any process from small operations such as supplying compressed air or controlling small steam generators, to complex processes found in paper mills, synthetic plants or power generating stations.

Given a receptive frame of mind it is only a short step to an understanding that this kind of equipment, as is true of any machine, must be kept in good operating condition to give us the results we need. We know from experience that too often malfunction of machinery is due to mishandling or misunderstanding of its operation. We have to maintain a maintenance group to take care of our heavy equipment to control this factor as well as normal wear. On the same basis we need instrument specialists to keep these much smaller machines functioning as we expect.

By W. G. BAKER, JR.
Instrument Department
American Enka Corporation
Lowland, Tennessee

Responsibility

Responsibility and authority have to be pinned down to one person. Depending on the scope of the operation, he need not be a specialist only in that field. In a smaller plant it may be only a part of his duties. In a larger plant it may be full time—with many assistants. In any case the



THE PRESSURE GAUGE is the most widely used instrument in industry. Being a simply constructed instrument, its maintenance is often neglected, but it should be calibrated at regular intervals against a known pressure standard.

Calibration equipment may consist of a manometer for low pressure ranges with a regulated air supply to supply the test pressure (see top sketch). Manometer can be made of a piece of glass tubing bent into a U shape, but those supplied by instrument manufacturers are usually more satisfactory.

For pressures over 30 lb and up to the limit of the available air supply, a test gauge which has been calibrated against a dead weight tester is used (see lower sketch).

responsibility should be specifically located.

Two things are important to proper instrument maintenance and installation. First, the man or men must know how to do the job; and second, a work area with sufficient tools and equipment must be provided.

Personnel and Data

Selections of men for such jobs should be done with a great deal of care. They should have good educational background and the necessary aptitude to permit maximum learning capacity. An alert mind and a desire to keep abreast of changes and improvements are essential. Previous specialized training in electricity, electronics or machine shop is highly desirable, because men who have made progress in those trades are readily adaptable. That is important because we rarely find a competent and skilled instrument man available for a new job; consequently, we must train our own men.

In addition to reasonable equipment the service man must be supplied with all necessary reference and service manuals on instruments for which he is responsible. Instrument manufacturers supply excellent service information for their products. Such information is essential in calibrating or repairing instruments. Since there is such a large variety of types and models it is impossible for the maintenance man to memorize all the information needed to calibrate and repair.

These same manufacturers can and will supply technical advice and help. Certain of them operate instrument schools to train selected personnel in operation and repair of their instruments. They are happy to make their experience available to you.

Maintenance Suggestions

Naturally tools and equipment needed for calibration and maintenance will depend upon numbers and types of instruments in the plant. Without becoming too technical, or attempting to procedurize, the following requirements for calibration and maintenance of common types of instruments are suggested.

Equipment and methods for **pressure gauges** and **thermometers** are illustrated.

Flow meter calibrations can be made by several different methods depending on the type of meter. Some meters are supplied with calibration devices, others require a water column or air pressure and a manometer. Some of the newer diaphragm types can be calibrated with dead weights. In general the calibration of a flow meter consists of correctly setting the zero of the pen or pointer and checking the meter at one or more points on the scale. Refer to the instrument service manual for recommendations for a specific meter.

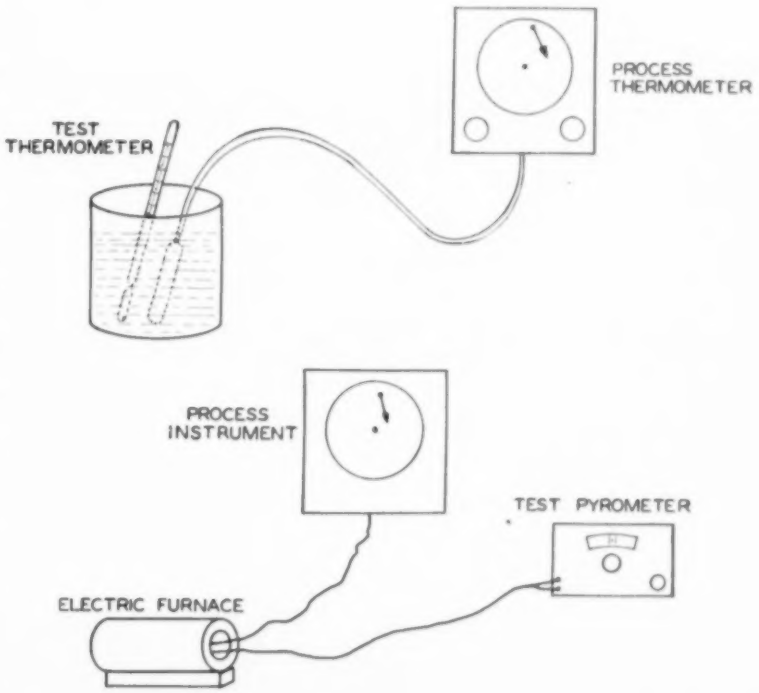
The installation of a flow meter is more critical than the installation of most other types of instruments. Some items which will cause errors in readings of flow do not show up as obviously as do incorrect installations on other types of instruments. The flow meter installation should be carefully checked for leaks in the connections between the orifice and the meter. A very small leak can cause a serious error in reading. The lines should be kept free of dirt or other foreign matter. The lines should be sloped between the orifice and the meter body to

(Continued on page 90)

THERMOMETER testing equipment depends upon the temperature range. Up to around 200 F, a glass test thermometer can be used for calibration. If the test thermometer can be inserted into the process fluid the calibration can be made quickly without disturbing the process. If this cannot be done, the thermometer to be calibrated should be removed from the process and placed in a container filled with water and heated to the desired temperature.

A test thermometer is inserted with the process thermometer, the liquid agitated, and the readings of the two thermometers observed after they have reached equilibrium (see top sketch). If process thermometer does not agree with the test thermometer, it should be adjusted according to manufacturer's recommendations.

For temperatures above 200 F, a pyrometer with a calibrated thermocouple can be used with a small electric muffle furnace for heating the thermocouples (see lower sketch).



Maintenance financing unusual problem in government owned plant . .

Deferred Maintenance Program

BY F. C. CLAYTON,
Chief Plant Engineer, Consolidated Vultee Aircraft Corporation, Fort Worth, Texas

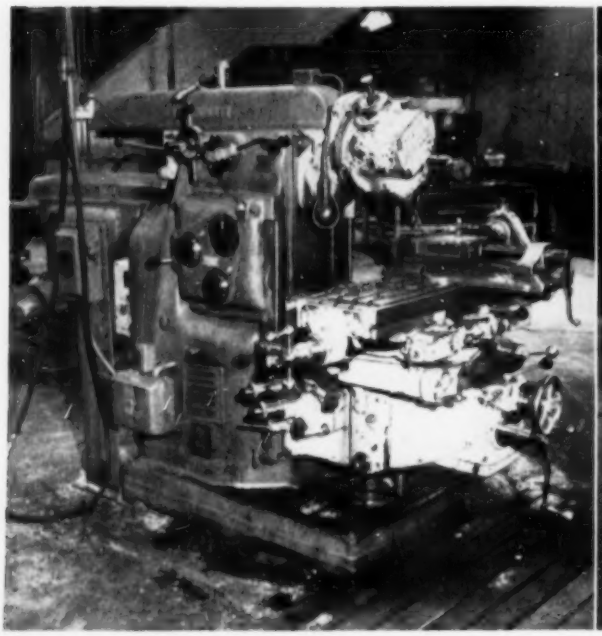
OPERATION of a Government-owned aircraft plant presents many problems which must be solved in a different manner than would be utilized in a privately owned plant. One problem is of major plant maintenance. While day-to-day preventive maintenance is carried on in the same manner and with all of the advantages and success found in well managed privately owned plants, major maintenance, such as complete overhaul of machine tools, utilities and to some extent buildings, presents a problem requiring a rather unorthodox solution.

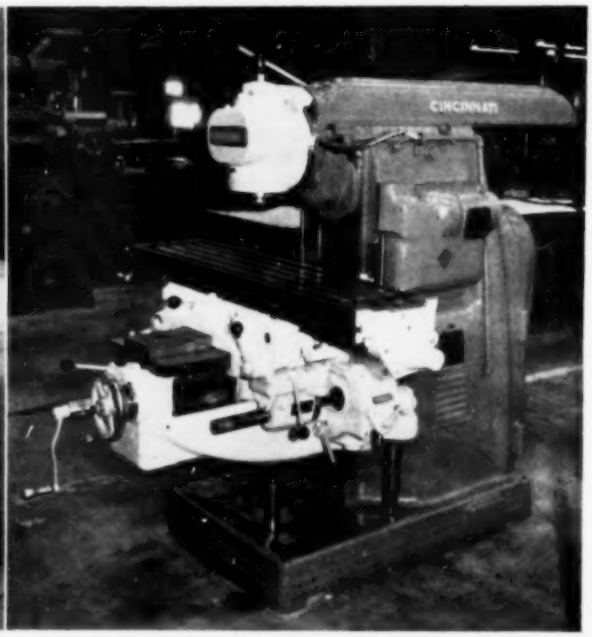
Maintenance Budget and Plant Activity

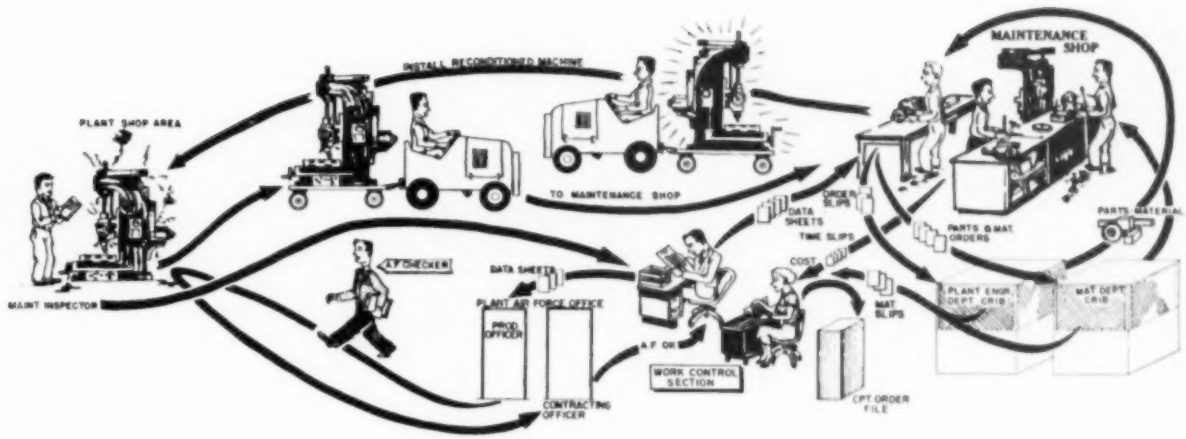
The principal maintenance problem is one of finance. Maintenance is an overhead cost, which is an item of major consideration in letting of Government contracts on a "cost plus a fixed fee" basis, such as is common in the aircraft industry. Under this system, **money available for maintenance is a function of plant activity,** usually measured in direct labor man-hours.

At high levels of activity, funds are relatively plentiful, but at low activity, little maintenance money is available. On the other hand, at high levels of activity all machines, equipment and floor space are utilized and cannot be spared from production for performance of major maintenance. Conversely, when the plant is not busy and equipment is relatively idle, no money is available for overhauling it.

PRODUCTION MACHINE TOOLS constitute the major portion of the program. Aim is to overhaul or rebuild them to manufacturer's standards for new tools. Here's a typical "before and after" reconditioning job.







HOW THE DEFERRED NORMAL MAINTENANCE PROGRAM IS ACCOMPLISHED

Procedure 1—Determination of Condition of Item and Estimated Cost of Reconditions.

A. Shop section inspects item at installed location. Fills out DATA SHEET.
1. Condition Code
2. Inspection data
3. Estimate of cost of reconditioning
4. Outlines work required

Procedure 2—Request for Air Force Approval to Perform Work.

A. Data sheet submitted to local A. F. representative for approval to perform outline work at estimated cost.

B. A. F. reviews DATA SHEET, checks item in plant, A. F. approves, or disapproves, data sheet request and returns request to Plant Engineering Department.

Procedure 3—Item Reconditioned and Parts Replaced or Repaired as Required.

A. Release of item obtained from using plant department.

B. Item reconditioned on location or in maintenance shop.

C. Required parts obtained from special department cribs, or materials from material department cribs.

D. Work control section collects all labor and material charges for each job.

E. Following reconditioning:

1. Item given final checkout inspection and test data recorded on data sheet with new condition code and summary of work performed.

2. Item reinstalled and a two week trial run made before job order is closed out.

Procedure 4—Job Closed Out and Total Cost Reported.

A. On job completion step E-2 above all costs of labor and material are totaled, job data sheets completed by recording final inspection data, listing work performed, total cost of labor and material, new condition code, sheets signed off and copy of data sheet returned to A. F.

B. Complete job file of all orders for material, time sheets, data sheets, etc., placed in permanent file.

C. Total costs recorded for monthly reports on Deferred Normal Maintenance Program.

Special Program Designed

Convair's plant engineering personnel were faced with this situation and realized that most of the major maintenance now required would normally (in a privately owned plant) have been performed during production runs by the utilization of spare equipment. Their task of bringing the plant back up to good physical condition has thus been properly described as deferred maintenance and a special program (entirely separate from the production contract) has been worked out with the Air Force. The flow chart indicates procedures followed in the accomplishment of this program.

Under the "Deferred Maintenance Program" approximately $1,500,000 (appropriated to make repairs accumulated during past operation), will be spent in a year's time. The work falls in three general categories: Machinery and Equipment, Building Installations, and Buildings and Grounds.

Cost & Operational Control

In starting the program, under terms of the contract, it was first necessary to work out the system to be used to keep costs, and at the same time establish tolerance standards and inspection methods. A single data form was designed for each type of machine or other facility, incorporating in addition the space for identifying description, the individual items to be checked, tolerances to be achieved and record of man-hours and materials and parts used.

In the case of production machine tools, which constitute the major part of the program, the aim is to overhaul or rebuild them to manufacturer's standards for new tools. In some cases of machines used for specific purposes even closer tolerances than "like new" are held.

Inasmuch as this program was superimposed on the Plant Engineering Department's normal functions of routine maintenance and repair, additional personnel

GENERAL VIEW of the special overhaul area established at the Convair, Fort Worth, Texas, plant.

and equipment were necessary. A training program was set up, utilizing new or low rated employees who showed mechanical aptitude and reasonably high I. Q. These were "blended in" to the crew, using a small group of older, highly skilled workers as a nucleus. Stock cribs were set up for the control of materials and parts. A "Work Control" unit was established to handle all paper work, approvals, orders and cost records. This unit performs a normal production control function in scheduling orders and materials to assure a smooth flow of work in the shop.

Although the program has been operating formally for only two months, a number of machines have been completed. In all, it is planned to rework approximately 1049 machine tools, of 84 types. In addition, utility systems consisting of water and sewer piping and electrical distribution will be gone over and replaced where necessary to assure a high level of continuity of operation. Boilers and condensers are being re-tubed. The 20 odd miles of monorail are being re-aligned, and worn rails replaced. The large vertical lift doors are being overhauled, including nine doors of 40 x 195 ft size, utilizing nearly 7000 ft of wire rope each.

General plant improvements include repair of traffic aisles which have become badly worn through continuous heavy use, particularly during World War II when rubber tired casters for shop trucks could not be obtained. This, together with much new concrete pavement, rehabilitation of roofs, communication systems and the sandblasting and painting of exterior steel walls will not only give the plant a "new look" but will restore its original level of utility and efficiency in preparation to meet the needs of the nation's defense effort in the future as it has in the past.

(*Continued from page* 69)

Planned Overhauls—Key To Productive Maintenance

Adapted from **Scheduled Maintenance for High Level Production,** a talk by **S. G. Dinkel,** engineer, Apparatus Division, **General Electric Co.,** New Orleans La. Discussion, **starts on page 69.**

Planned Overhaul? One good bench mark is age and service given the windings. In determining at what age a certain machine should be rewound you should consider duty-cycles, surges, overloading, etc. All these factors contribute to the oxidation of the materials used in the manufacture of the windings.

"There are six principal considerations:

"1. The age of the machine since purchase or latest overhaul.

"2. The function and productive importance of the machine. If the machine is in a key position with relation to other operations, compare breakdown cost against Planned Overhaul cost.

"3. The probable retirement or replacement of the machine.

"4. Past experience on similar machines that operate under the same conditions.

"5. Consideration of the reconditioning of dependent or secondary equipment at the same time.

"6. Attempt to maintain the average age of the machine windings at some pre-determined number of years. Many companies have allowed this average to become too great, resulting in a radical increase in the frequency of breakdowns. This, of course, not only increases lost production time, but forces you to overhaul and repair your machines at inconvenient times."

Productive Maintenance (Routine Maintenance plus Planned Overhaul) is an idea for all industry to follow. It is for every kind of equipment and provides a means of creating extra production at less cost.

Electrical Maintenance Subcontracted

Florida and Georgia cigar plants reverse the "do-it-yourself" trend and subcontract electrical maintenance.

SINCE the King Edward cigar plant in Jacksonville, Fla., has about 900 pieces of electrically driven or actuated equipment, the job of electrical maintenance is of paramount importance in preserving continuity of operations. Power failures, whether external or internal, can play hob with production schedules and are costly. Constant watchfulness is essential.

In the case of the Jacksonville plant, this watchful maintenance service is performed by the Standard Electric Co., of Jacksonville, an electrical contracting company, which keeps an electrician on duty during the daytime eight-hour shift, and one always within call during the nighttime shift. At a branch cigar manufacturing plant in Waycross, Ga., the Ware Electric Company operates similarly except that in Waycross an electrician is on call rather than on permanent assignment.

System Advantages

Many years of operating electrified units have convinced Jno. H. Swisher & Sons, Inc., owner of these plants, that a well-staffed electrical contracting company can furnish more economical and efficient electrical maintenance than the company could provide for itself even though it has work enough for full-time electricians. Here are some of the advantages in utilizing the services of an electrical contractor.

1. In case of absence of an electrician because of illness, vacations, etc., the electrical contractor can furnish a substitute without additional cost to the plant, which, if it had its own electrical staff, would have to employ standby electricians.

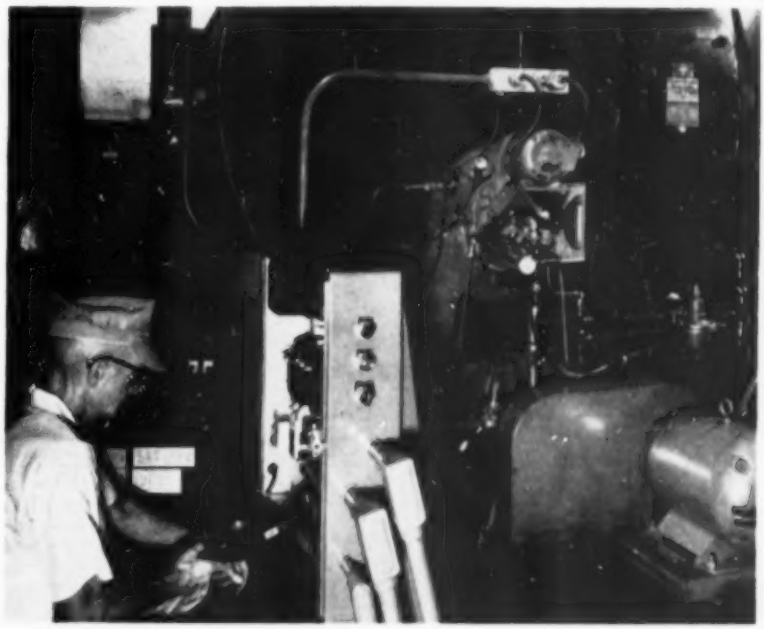
2. If there is a major breakdown, which might, if not repaired quickly, run into serious production losses, additional electrical help can be quickly obtained from the contractor.

3. When important equipment changes are made, the electrical contractor is in a position to supply a full crew to make such changes quickly so as not to interrupt production for any great length of time. Five of these complete changes to more modern equipment have been made during the 29 years the Jacksonville plant has been in operation.

4. The electrical contractor's advice is constantly available as to electrical layouts and hookups so that the effect of an internal power failure can be confined to a small area. For example, four is the maximum number of machines on one circuit in the production department, which is broken up into sub-feeds so that not more than 25% of machines would be down at one time from any cause other than an outside power failure.

Tending to this large amount of electrical equipment might appear to be more than a one-man job, but the management of the Swisher plant says that for regular maintenance one man constantly on guard against possible contingencies is sufficient notwithstanding the multiplicity of operations to be watched. Standard Electric is within five minutes by automobile from the plant so that any extraordinary service requirements can quickly be met. That the service

(*Continued on page* 90)



MOTOR AMPERAGE is being checked by L. A. Crisp in the King Edward cigar factory in Jacksonville, Fla. Cleaver-Brooks boiler is one of three in the plant that provide process steam and plant heating.

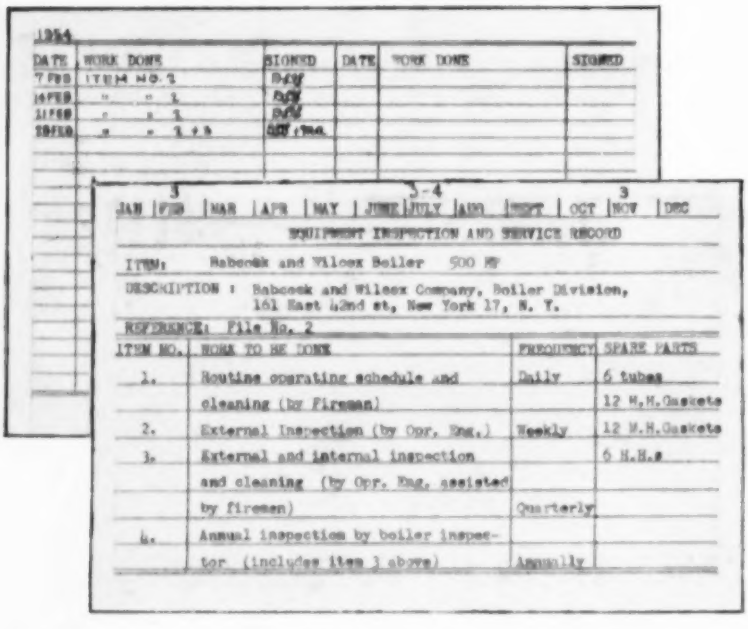
Five Southern plants provide experience for inspection and repair schedules . .

PREVENTIVE MAINTENANCE in the Small Boiler Plant

IN visiting many small steam plants in factories and institutions during the past several years we have found that preventive maintenance and good housekeeping are the two essentials that are the most neglected. Housekeeping and maintenance go hand-in-glove. If one is neglected, then so is the other. It is not at all unusual to enter a hotel or office building or small factory that is immaculate in its outer appointments, and then go down into the boiler room and find what may be best described as a mess. And yet, the boiler plant is literally the heart of the operation; without it the function of the building would be seriously impaired.

Lack of maintenance is nearly always blamed on the operating personnel. Yet careful investigation will almost invariably place the responsibility directly on management. Some of the conditions are the responsibility of the design engineer. A poorly designed plant or an installation that is not well lighted does not lend itself readily to adequate and proper maintenance. There is often a casual and shocking indifference in design, resulting in equipment drains that end in mid-air and relief valves that discharge at random.

When management is not interested in maintenance the operating personnel easily become accustomed to fixing only the thing that is broken or operating with an unusual noise. After a lengthy period of accumlated indifference the operator becomes accustomed even to the excessive noise or the odor of burning insulation—and the tendency becomes overpower-



1954

DATE	WORK DONE	SIGNED	DATE	WORK DONE	SIGNED
7 FEB	ITEM NO 2	D&W			
14 FEB	" " 1	D&W			
21 FEB	" " 1	D&W			
28 FEB	" " 1 + 2	D&W Insp.			

JAN | FEB | MAR | APR | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC

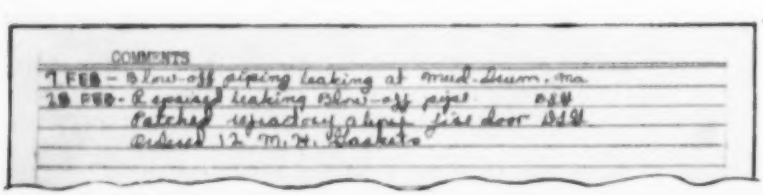
EQUIPMENT INSPECTION AND SERVICE RECORD

ITEM: Babcock and Wilcox Boiler 500 HP

DESCRIPTION : Babcock and Wilcox Company, Boiler Division, 161 East 42nd st, New York 17, N. Y.

REFERENCE: File No. 2

ITEM NO.	WORK TO BE DONE	FREQUENCY	SPARE PARTS
1.	Routine operating schedule and cleaning (by Fireman)	Daily	6 tubes 12 H.H.Gaskets
2.	External Inspection (by Opr. Eng.)	Weekly	12 H.H.Gaskets
3.	External and internal inspection and cleaning (by Opr. Eng. assisted by firemen)	Quarterly	6 H.H.s
4.	Annual inspection by boiler inspector (includes item 3 above)	Annually	



COMMENTS

7 FEB - Blow-off piping leaking at mud drum. D&W

28 FEB - Repaired leaking Blow-off pipe D&W
Patched refractory about fire door D&W
Ordered 12 H. H. Gaskets

FIG. 1. Typical record system card. Front side is equipment inspection and service record; back includes date, work done, etc. Only 20 to 30 cards will be required in the average small plant.

FIG. 2. If you wish to provide a second card for comments, it should be placed directly back of each equipment card.

By DENARD L. GUSLER
Watson and Hart
Consulting Engineers
Greensboro, N. C.

Mr. Gusler's early experience included serving as maintenance mechanic and electrician for a furniture factory and as power plant operator for American Viscose and E. I. du Pont. During the war, he was a radar technician in the U. S. Marine Corps. Later, he did plant engineering work with Stanley Furniture Company and Bassett Furniture Industries before joining the organization of Watson and Hart.

ing to exercise a morbid curiosity. That is: curiosity to see how long it runs before it bursts.

This discussion is based on experience in five boiler plants that actually had every bad condition previously mentioned. The five plants were hand-fired coal burning installations using HRT boilers and natural draft. A total of fourteen HRT boilers were installed with the usual boiler auxiliaries. Two of the plants were modernized to the extent that automatic combustion and fuel feeding equipment was installed. And the other three plants were replaced with completely new modern steam generating facilities.

Most readers at this point will jump to two conclusions: (1) with automatic combustion and fuel feeding equipment maintenance becomes easier, and (2) with the new installations a higher caliber of operating personnel was employed with resultant improvement in maintenance. The first conclusion is of course true, but the second is not.

Operators employed in the new installations were the same men that had worked for years in the old installations. It would seem highly improbable if not impossible that they could become accustomed and even accept with enthusiasm the rigid discipline of proper maintenance. It is actually true however that these same operators when given plants that were cleaned, painted, and well lighted went to special efforts to keep them immaculate. Floors were not only painted but also waxed. Windows were washed and a keen competition developed between shifts to leave the equipment in the best possible condition.

The results that were accomplished can be attributed directly to a system of preventive maintenance that was initiated by the management and a careful check made to see that all phases of the program were carried out to the proper degree.

Preventive Maintenance is the scheduled inspection and servicing of equipment that is necessary to keep it in operating condition. Preventive maintenance results in controlled shutdowns as opposed to emergency shutdowns. It is the repair of equipment before a harmful condition is allowed to develop. Whether equipment lasts five years or thirty years may be directly attributed to the manner in which it is maintained. It has long been established that the cost of operation over a period of years is definitely lower in the well maintained plant.

Record System Essential

The record system and maintenance schedules presented here are typical and will apply to most boiler plant operations. Lubrication is only briefly mentioned. Full coverage of that important subject alone would constitute a full length article. When a company enters into a contract with an oil company to use their products, the oil company will gladly furnish the services of competent lubrication engineers to set up routine lubrication schedules applicable to all plant equipment.

The record system employs a separate card for each major item of equipment in the boiler plant. A typical card is shown in Figure 1. The face of the card should include all of the months and the designation **Equipment Inspection and Service Record.**

Under ITEM should be listed the actual equipment. Under DESCRIPTION should be listed information that will facilitate the ordering of replacement parts, the name of the manufacturer, and the address, etc. REFERENCE should include the file number of the folder that contains the shop drawings and operating manuals supplied by the manufacturer. ITEM NO. should number the routine inspection and service. WORK TO BE DONE is self-explanatory. FREQUENCY should indicate the intervals at which the equipment should be inspected and serviced. The time for quarterly and annual inspections is noted by checking the month at the top of the card. SPARE PARTS should include the list of spare parts normally carried in the supply room.

The back of the card should include the date, work done, and a space for the initials of the person doing the work. The sample data provided will indicate how the cards may be utilized.

Only 20 to 30 cards will be required in the average small plant. A very small installation will require even less.

A second card may be provided for comments as shown in Figure 2. This card should be placed directly beyond each of the equipment cards. The entire assembly of cards can be easily placed in a looseleaf binder. A duplicate copy of the basic cards can be kept in the office of the management, both as a check on the maintenance system and to provide insurance against a very valuable record being lost. The plant copy of the maintenance record can be turned into the office monthly so that the office copy can be brought up to date. Such details of handling

Small boiler plant maintenance data (continued)

have to be worked out to suit needs of the individual plant.

Maintenance Schedule

The following schedule and preventive maintenance procedure is extremely brief and merely serves to illustrate the system that responsible supervision should establish. In setting up a system it will be necessary to amplify and perhaps modify the schedules and procedure to suit existing conditions and equipment. "A Schematic Diagram of a Typical Steam Plant" is shown in Figure 3.

The essential items of equipment that should come under the maintenance schedule are numbered 1 through 15 and these numbers on the diagram correspond to section headings in the accompanying schedule. A larger steam plant will have more equipment, a smaller plant less; only basic essentials are shown. It is important to realize that every mechanical item in a steam plant whether stationary or moving is subject to abrasive wear of some kind, either mechanical or chemical.

RECOMMENDED INSPECTION SCHEDULE

(See Corresponding Numbers on Diagram)

NO. 1 BOILER

Daily—Blow down as required by boiler water tests.

Blow down water column.

Clean external setting of boiler, including gages and instruments.

Weekly—Carefully examine external setting of boiler. Note items which require correction and make repairs where possible.

Quarterly—Drain boiler and secure all valves.

Thoroughly clean interior of boiler. Use tube cleaners where necessary to remove any accumulation of scale. Examine boiler for oil deposits and corrosion. Check chemical feed line and boiler feedwater line for plugging.

Check all instrument connections to the boiler for plugging, including water columns, low water cutout, damper and draft controls, pressure gauge, feedwater controls and continuous blowdown.

Examine all refractory surfaces and baffles for erosion, spalding, or any other failure. Repair as necessary. Examine for movement of walls. Repair or rebuild any refractory wall or sections that have moved excessively. Re-caulk expansion joints as necessary.

Examine soot blowers for warping or misalignment. Check to see that jets are not impinging on tubes. Readjust soot blower cycle if necessary.

Clean soot and slag deposits from tubes that are not cleaned by the soot blowers. Remove heavy accumulations of slag from refractory walls and water walls.

Check metal setting of boiler for corrosion. Wire brush and paint any areas that are corroded. Examine setting for leaks, and repair.

Thoroughly check up-take damper for freedom of movement and worn linkage. Repair as necessary.

NO. 2—FEEDWATER REGULATOR

Daily—Simply clean metal surfaces and see that the regulator is maintaining the proper water level.

Weekly (or when boiler is taken out and put back in service)—Blow down steam and water connections in accordance with instructions furnished by manufacturer.

Annually—Examine mechanical linkage, lift bonnet of feed valve and inspect valve seat. Repair as necessary.

NO. 3—NON-RETURN VALVE

Operate when necessary for taking boiler out of service. Dismantle valve only when leaking is suspected. Repair as necessary.

NO. 4—RELIEF VALVES

Weekly (or as required by insurance company)—When operating at light load gradually raise steam pressure on boiler until safety valves pop-off. Record pop-off and blow back pressure. Adjust valve as necessary.

Quarterly—Thoroughly clean exterior of safety valves to remove any accumulations of foreign matter that might interfere with the action of the valves.

NO. 5—WATER COLUMNS

Daily—Blow down water column on each shift.

Replace cracked or damaged gauge glasses immediately.

Keep gauge glass and water column clean at all times and see that adequate illumination is provided at the water column.

Monthly—Test high water alarm by allowing the boiler to accumulate water when operating at light load.

Annually—Remove bonnet of water column and examine high and low water alarm float and linkage. Replace as necessary. (For this instrument replacement is better than repair)

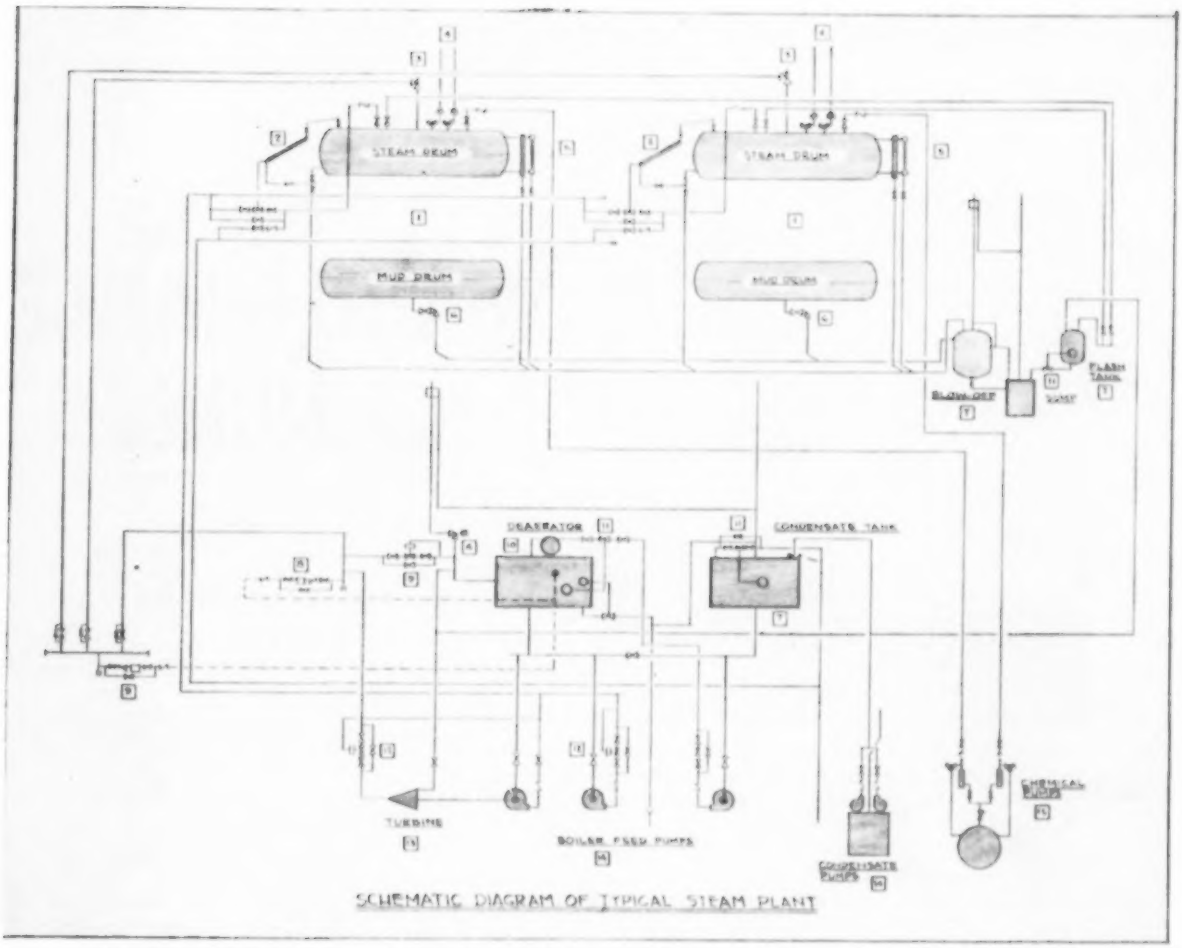


FIG. 3. Essential items of equipment that should come under the maintenance schedule are numbered 1 through 15. These numbers correspond to section headings in the accompanying schedule.

NO. 6—BLOW-OFF VALVES

Daily—Clean and lubricate. Operate as necessary in accordance with indication of water tests.

Open valve adjacent to mud-drum first and blow down with valve that is the most remote from the mud-drum.

Feel tail pipe to determine if blow-off valve is leaking. When a leaking blow-off valve is discovered, repair at first opportunity.

Annually—Remove bonnet of blow-off valves and inspect valve seats.

Replace as necessary.

NO. 7—TANKS

Annually—Clean interior.

Examine interior and exterior for corrosion. Paint or repair as necessary.

NO. 8—TRAPS

Daily—Clean exterior and check to see that traps are operating properly.

When a trap is found that is not operating properly, remove from service and repair immediately.

Annually—Remove bonnet of trap and examine for mechanical defects.

Clean interior and repair as necessary.

NO. 9—REDUCING VALVE

Daily—Clean exterior and observe setting. Correct as necessary.

Annually—Completely dismantle valve and pilot. Examine mechanical parts and replace as necessary.

NO. 10—DEAERATOR

Daily—Operate float control valves through full range of operation.

Check low water alarm.

Check air vent on vent condenser.

Check operating temperature.

Clean gauge glass and exterior of deaerator. See that adequate gauge glass illumination is provided at all times.

Annually—Open access doors to deaerator and examine inter-

(*Continued on page* 108)

Choosing the right grinding wheel is important, but a few general purpose types will serve most needs.

FIG. 1. Proper wheel selection is very important. The distributor salesman can make his recommendations best by going into the shop with the foreman and checking the job himself.

MAINTENANCE GRINDING

By ROGER M. PERRY, JR.
Technical Service Section
Norton Company

THE PROBLEM of grinding wheel selection in a plant where grinding is limited to occasional maintenance work is a very real one. Gone are the days when one wheel would do every job in the shop. Still, such a plant cannot expect to maintain a wide selection of wheels for the many types of grinding which are done during the year. The answer is a small selection of general purpose wheels.

Types of Grinding

The first step in handling the grinding wheel selection problem is to analyze the types of grinding done. Probably most of the work will fall under the headings: Tool sharpening, rough grinding, and general shop work.

Tool Sharpening includes all types of tools—using either off-hand or precision grinding techniques. Tools ground off-hand include lathe tool bits, cold chisels, axes, wedges, burred heads on tools struck with hammers, etc. Precision grinding of tools for purposes of this article might be described as any operation in which the work to be ground is held in a work holder in a grinding machine so that the grinding wheel cuts in a prescribed plane, or at a set angle, or about the periphery of the work. Such grinding would include sharpening of drills, milling cutters, saws, shaper knives, dies and punches.

Rough Grinding is done on bench or floor stand grinders and with portable power tools, and includes such jobs as cleaning castings, weld grinding, removing rust prior to painting, fitting structural iron work, etc.

General Shop Work includes precision grinding on cylindrical, universal, or surface grinders. Tool post grinders would also be included. Maintenance men employ this type of grinding in repairing valves, regrinding parts built up by welding or metalizing, in making repair parts for machinery, regrinding knives and rolls.

Principle of Grinding

Before looking into the problem of wheel selection, it is important to understand the principle of the grinding wheel. There are three components in a wheel. These are abrasive grains, bond, and pores. In the manufacturing process, each grain is coated with bond which may be ceramic (clay), resinoid, rubber, shellac or silicate. Under heat, the individual grains are stuck together by the molten bond. This can be easily visualized if we compare a grinding wheel to a popcorn ball. In this example, the popcorn is the grain. The molasses is the bond, and of course, the air spaces are the pores.

When the grinding wheel is used, the sharp edges of the abrasive grains cut minute chips from the work. As the outer layer of grains becomes dull, they tend to drag against the work. This extra drag is enough to break the grains from the bond, exposing new sharp grains underneath.

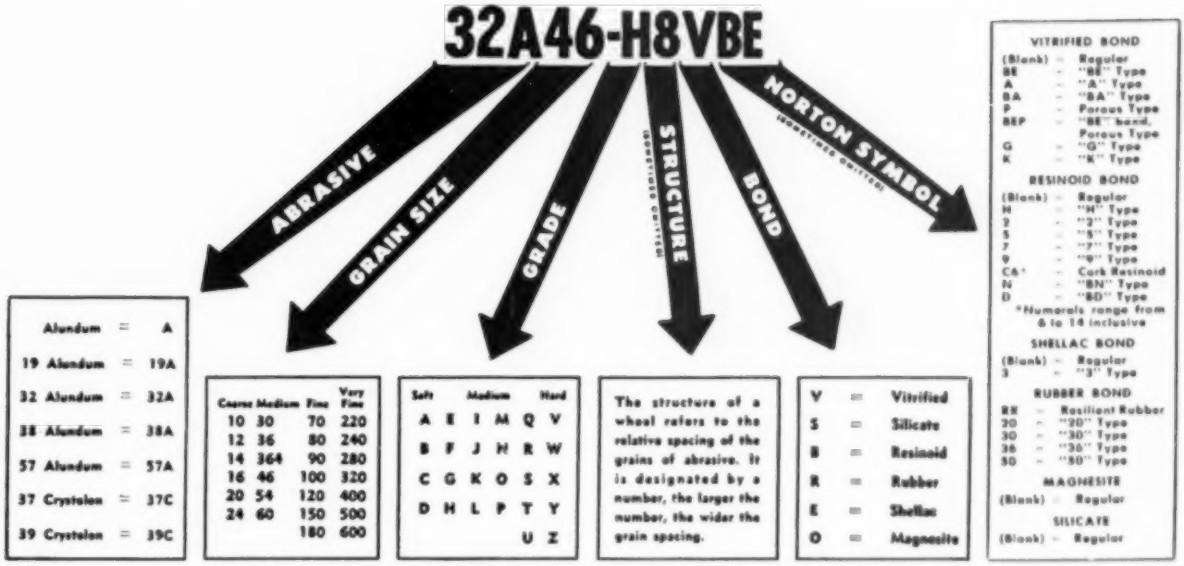


FIG. 2—Chart showing standard grinding wheel markings.

In a wheel which has been properly selected for the job, the bond is just strong enough to hold the grain in place until it becomes dull —then it breaks. If the bond is too strong, dull grains are left on the face of the wheel, requiring a dressing operation to restore sharpness. If the bond is too weak, the grains are pulled out before they have performed all the useful work of which they are capable. This causes rapid wheel wear. This is not only poor economy but makes it very difficult to maintain dimensional accuracy in tool and precision grinding.

Grade is the term used to indicate the holding power or "hardness" of a grinding wheel. Hardness in a wheel may seem misleading since all abrasive of a given type has the same degree of hardness. Actually, a hard wheel is one in which the bond posts holding the grains together are thicker than the bond posts in a soft wheel. Hardness is a property built into each wheel by the manufacturer and it is designated in the grinding wheel marking.

Abrasive Types

In general, there are two principal types of abrasives in common use today. These are aluminum oxide and silicon carbide. Both are products of electric furnaces. Aluminum oxide is made by fusing bauxite. Silicon carbide is made by fusing coke and sand. A third abrasive has also come into wide use in the last 20 years. That is natural diamond. But, because of the high wheel cost, diamond wheels are rarely found in maintenance shops, except perhaps for finish grinding carbide tools.

It is a general rule of thumb that aluminum oxide abrasive is used for grinding ferrous materials, and silicon carbide for nonferrous and non-metallics. There are of course some exceptions to this rule but for most maintenance grinding, this will hold true.

Abrasive Size

The size of the abrasive grain particles in a grinding wheel determines to a large degree the type of finish which can be obtained. In general, larger sizes of grain will remove stock faster. While larger sizes of grain produce a rougher finish than the finer sizes, it is possible to produce a reasonably fine surface using a large size grain if a few passes with a very light feed are made at the end of the grinding operation.

Grain size is designated by the size of the screen through which the grain will pass. For example, a size 60 grain will pass through a screen which has 60 openings per linear inch. The higher the number, the finer the grit size.

Another general rule of thumb to remember is that coarse abrasive grain should be used for soft, ductile materials, and fine grain should be used for hard, brittle materials.

Wheel Specification

With the preceding discussion as background, the meaning of a standard grinding wheel marking should be clear. Fig. 2 shows a standard grinding wheel marking in chart form which helps to explain the various symbols. All manufacturers have now adopted this marking system.

Although all manufacturers have adopted the same marking code, it should not be construed that the wheel of one maker will produce a duplicate grinding action of that of another maker with the equivalent marking. If we analyze the marking in Fig. 2, we can see why this is true.

The first item in the sample wheel marking is "32A." The "A" represents aluminum oxide abrasive for which the Norton trademark is Alundum. The "32" stands for a particular kind of aluminum oxide. Abrasive grain of the same general type has several variations, such as color and shape, which has an important bearing on selection. For example, 32 Alundum grain is nubbly and blue-gray in color. It is used widely for tool

Key to Letter Dimensions

A — Radial width of flat at periphery.
B — Depth of blind hole bushing.
D — Diameter (overall)
E — Thickness at hole.
F — Depth of recess one side.
G — Depth of recess other side.
H — Hole diameter.
J — Diameter of outside flat.
K — Diameter of inside flat.
N — Depth of relief one side.
O — Depth of relief other side.
P — Diameter of recess.
R — Radius.
S — Length of cylindrical section.
T — Thickness (overall).
U — Width of edge.
V — Face Angle.
W — Wall (rim) thickness at grinding face.

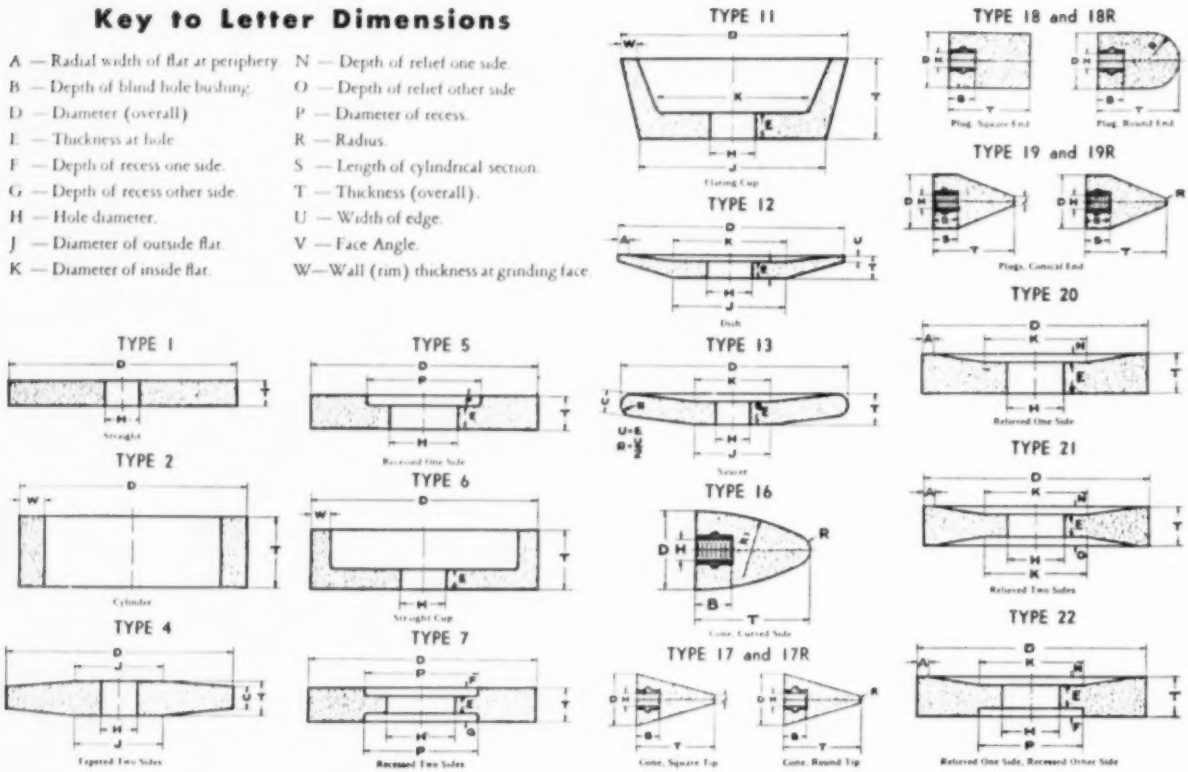


FIG. 3. Standard types of grinding wheels.

grinding. The 38 Alundum is pure white in color and is also used for tool grinding. Regular Alundum, on the other hand, is brown-gray in color, stronger, blocky in shape and is used widely for rough grinding.

Grain size is measured by U. S. Standard Sieves and will be the same in all makes of wheels made in this country.

While all manufacturers now designate grade by letters of the alphabet with the soft grades represented by the first letters, a J grade wheel from one maker will not necessarily have the same hardness characteristics of a J grade by another maker. However, the J grades between lots from the same manufacturer will be the same within very close limits.

The range of Norton structure numbers is from 1 to 12, with the latter being a very porous, open type structure. This marking sometimes is omitted since a standard wheel has a standard structure which will be built into the wheel unless the customer specifies otherwise.

The type of bond is always included in a grinding wheel marking. Vitrified and resinoid bonds are the most common. The others have fairly limited applications which need not be considered here. Vitrified bonds are made of clays and other ceramic materials which fuse under the heat of the kiln and form a glass which holds the wheel together. This type of bond is the most widely used. Resinoid bonds are used primarily for rough grinding operations because this type of bond permits surface speeds about 50% greater than with vitrified bonds. The wheel wear is greater than with vitrified, however. Resinoid wheels for rough grinding are made in the form of cones and cup wheels as well as straight wheels.

The final letter in the marking is a further modification on the bond type. Each manufacturer uses his own marking for his own bond designation.

Wheel Shapes

Grinding wheels are made in a variety of shapes to fit the grinding machinery on the market. The standard types normally used for general purpose wheels are shown in Fig. 3. Types 1, 2, 5, 6, and 7 are used primarily on precision operations for surface or outside diameter grinding. Types 11 and 12 are used widely for tool grinding. The cone wheels shown as well as Type 11 are standard rough grinding wheels made with a resinoid bond.

Selection of Wheels

One of the most common applications for general purpose wheels is off-hand grinding on bench or floor stand grinders. An 8″ diameter, 1″ face wheel is a popular one for bench stands. For heavy, rough grinding, an A30-P5VBE wheel is recommended. For lighter grinding, including tool sharpening, an A46-N5VBE is appropriate.

In floor stand grinders using an 18″ diameter, 2″ face wheel, the recommendations would be A30-Q5VBE for coarse work and A36-O5VBE, for fine grinding.

Note the general trend indicated by these specifications. As the diameter increases, the grade should

Specifications for Sharpening Operations

	Coarse	*Fine*
High Speed Steel and Cast Alloy Lathe and Planer Tools	A36-05VBE	A60-M5VBE
Cemented Carbide Single-Point Tools	39C60-18VK	39C100-H8VK
H. S. S. Milling Cutters, Face Mills, Reamers, etc.	32A46-K8VG*	
Cemented Carbide Face Mills	39C602-J6B**	
Weld Grinding (7 x ⅛" or 3/16 or ¼) using BFR Reinforced Resinoid hub wheels	A24-KBFR	
Drill Grinding (over ¼")	19A46-L5VG	
" " (under ¼")	A100-I8VBE	

Notes:
* 19A and 38A abrasives are also used here.
** These tools are best ground with diamond wheels but if these are not available or the limited use does not justify purchase of a diamond wheel, this specification will do the job.

be harder and the grit size coarser to achieve the same grinding action.

Recommended general purpose wheels for surface grinding are as follows: for reciprocating table machines, 32A46-18VG; straight wheels for rotary table surface grinders, 19A46-J5VG; cup wheels, cylinders or segments for vertical spindle surface grinders, 32A24-H8VG.

For cylindrical grinding, a 19A60-L5VG wheel will handle most materials adequately.

Tool room grinding wheels vary considerably with the material to be ground. The accompanying table outlines suggested specifications for tool sharpening operations.

Wheel Speeds

The speed of a grinding wheel is almost as important as the correct specification. Too slow a speed means wastage of abrasive without much useful work in return. Excessive speed may result in hard grinding action and may introduce the danger of breakage. A grinding wheel should never be run at a speed in excess of that indicated on the wheel by the manufacturer.

These speeds (in surface feet per minute) are recommended:

Tool and Cutter Grinding	4500-6000
Cylindrical Grinding	5500-6500
Internal Grinding	2000-6000
Snagging (offhand grinding) Vitrified Wheels	5000-6000
Snagging, rubber and resinoid wheels	7000-9500
Surface Grinding	4000-6000

A handy formula for determining surface speed in feet per minute (SFPM) is (Dia. in inches ÷ 12) x 3.14 x rpm.

The speed of the wheel may be varied to meet surface speed requirement in several ways. The most common is by the use of step cone pulleys. As the wheel wears smaller, changing steps will increase the speed again. Some machines are wired with a rheostat in the drive motor circuit so that work speed may be varied.

Wet vs. Dry Grinding

In most cases, wet grinding, that is using a coolant to cool the work as it is ground, is recommended whenever possible. Coolant reduces the danger of burning the work, washes away chips which tend to load the face of the wheel, and helps the wheel produce a better finish. Coolant solutions generally are made by mixing about fifty parts of water with one part of a soluble grinding oil. Wet grinding is strongly recommended with wheels larger than 8". Wet grinding in conjunction with internal grinding is recommended when grinding holes are larger than ¾". Most tool grinding is done dry.

Wet grinding can only be done, of course, on machines which are properly equipped with coolant tanks, pumps, and tables designed for wet grinding.

Grinding Dust

The grinding operation produces fine chips of metal and particles of abrasive dust. The coolant used in wet grinding removes this material and allows it to collect in the form of grinding swarf in the bottom of the coolant tank. In dry grinding, the chips are distributed into the air. A dust collection system of some sort is recommended to remove this grinding dust. Several types are on the market, from small portable units to elaborate collection systems which will service an entire plant.

Grinding Safety

Grinding long ago ceased to be regarded as a dangerous occupation. However, as in the case of any power driven machinery, there are safe practices, which, if violated, can lead to accidents.

Before grinding wheels are shipped by the manufacturer, they are tested at higher than recommended operating speeds as a safety precaution. They are packed in such a manner that they will withstand rough handling in transit. However, it is possible that a grinding wheel can be damaged between the time it leaves the manufacturer and the time it reaches its eventual destination.

All wheels should be inspected as soon as they are received to determine their condition. Sometimes a wheel which appears sound may have sustained a crack in transit. To guard against using such a damaged wheel, it is well to give all wheels, when unpacked, a ring test. A ring test is performed by tapping the wheel with a nonmetallic object, such as the handle of a screwdriver. A sound wheel will give forth a clear, ringing tone. A cracked wheel will give a dull thud.

Large grinding wheels should be stored in wooden racks, preferably on edge. Small wheels may be hung on wooden pegs. They should not be left in drawers or on shelves where other objects can chip them.

When a wheel is mounted on a machine, it should be given a ring test to insure that it has not been cracked since it was last used. After mounting, the operator (and all others) should stand to one side when the power is turned on. If the wheel has any undetected damage, it will become evident during the first minute of rotation.

It is very important not to operate the wheel at a speed greater

(Continued on page 122)

These design and operating precautions will help cut maintenance costs

By WILBUR G. HUDSON
Consulting Engineer

Pointers on CONVEYOR BELTS

NEAR Memphis, Tennessee, a long 36" conveyor, rehandling damp sand from storage to barges, suddenly transformed itself into two 18" conveyors. There was no apparent shock nor other indication of trouble. The emergency stop button was pressed and inspection showed that a section of ¼" steel plate lining of the wood plank loading hopper had torn loose and had lodged in the feed chute in just the right position to slice the belt. In just two minutes the belt was sliced from end to end. An all-steel hopper costs little more than a lined-plank hopper and eliminates such a disaster.

Improper Belt

We had completed a coal handling installation near Richmond, Va., consisting of a routine layout of bucket elevator with tandem belt conveyor. Two months later a complaint was received about the conveyor belt. The belt was swollen, the covers softened, and it was trying to run convex-side upward—completely ruined under two months operation. Apparently no one in their engineering department had been advised that an oil-sprayed coal was contemplated. A belt with neoprene top and bottom covers was substituted and a follow-up inspection two years later indicated that no deterioration had taken place. Here was an instance of carelessness on the part of the customer's purchasing and engineering departments.

Common Troubles

Probably a cause of needlessly high maintenance most frequently

PARTIALLY loaded belt concentrates the wear on the central strip.

observed is partial loading. If the feed is constant (as usually is the case) the speed should be fixed at the point at which the belt will operate at rated or full load capacity. Thus the load will be distributed over the full width of the belt.

The major source of cover wear is load impact. Assume a 30" belt, 300' centers, for a coal handling capacity of 160 tph. If the speed is 200 fpm, each section receives load impact once every three minutes and the load is distributed across the belt. If the speed is 400 fpm each section receives impact every 1.5 minutes and the load is concentrated along a narrow central zone. Eventually then, the cover along this zone will be worn out while the outer sections remain untouched.

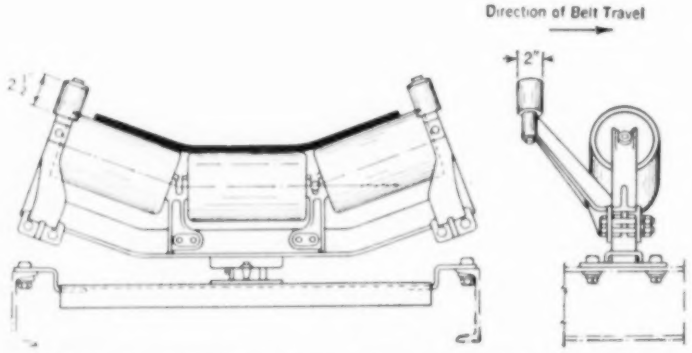
Moreover the low speed reduces the frequency of bends around the terminal pulleys and the contact of the grit-covered surface against the lower tripper snub pulley by 50%.

Finally, contact with the belt cleaning device is halved. In short, belt life probably will be trebled if the speed is 200 instead of 400 fpm.

Side guide idlers spaced along the run are helpful if considered for temporary alignment of a belt running off-center until the adjustment thus indicated is made—usually by swinging a few idlers a degree or two. But not infrequently we see the side guide idlers regarded as continuing centering devices, which do the belt edge no good.

The fact that the modern idler requires lubrication of the antifriction bearings only once every

(Continued on page 104)



TYPICAL side guide idler. Pressure from a side-drifting belt swings the pivoted idler to counteract the drift and indicate adjustment if called for.

THERE'S AN

EXTRA DIVIDEND IN

STEEL PIPE!

There are plenty of good reasons why you get top-quality pipe when you buy SPANG CW. But the very careful steps used to test and inspect SPANG CW Pipe prior to shipping give you an "extra dividend" that pays off in top-quality installations. Here's what we mean:

TESTING. Each length of SPANG Pipe is subjected to a hydrostatic test, the final check to make sure the weld is sound. Test pressures applied are well above actual requirements.

INSPECTION. Threads and couplings are gauged and measured for length, pitch and quality. Each length of pipe is inspected visually inside and out with the aid of light from fluorescent tubes to be positive that it meets SPANG's high product requirements.

To these two factors add quality steel, automatically-controlled furnaces, and the latest developments in mechanized production. Result: consistently good quality pipe for every type plumbing, heating, air conditioning, radiant heating and snow melting installation.

Why buy just any pipe when you can get top-quality SPANG Pipe at no extra cost? Specify SPANG CW Steel Pipe for your next installation.

SPANG-CHALFANT

DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Office: Two Gateway Center, Pittsburgh, Pennsylvania. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis.

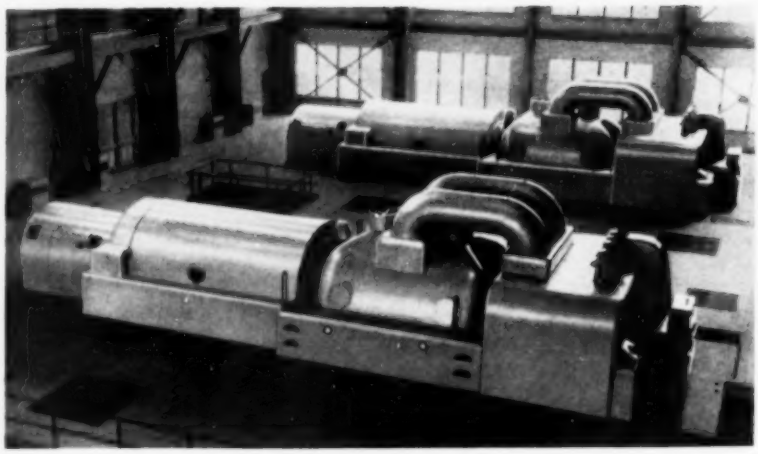
With every hour counting, we gave much thought to preparation . . .

Turbine Overhaul Outage Reduced

By GLENN EDWARDS, Superintendent

Lake Catherine Steam Electric Station, Arkansas Power and Light Company

THESE TWO Allis-Chalmers turbines at the Lake Catherine Steam Electric Station, Jones Mills, Arkansas, had been base-loaded at 52,500 kw for three years. Operating personnel felt that the units were long overdue for a complete inspection and overhaul. Careful planning and scheduling reduced outage time.



THE Lake Catherine Steam Electric Station of the Arkansas Power and Light Company, located at Jones Mills, Arkansas and serving Reynolds Metals Company's Aluminum Reduction Plant also at Jones Mills, Arkansas, put its first unit into production April 17, 1950, and the second unit one month later. These two units were Allis-Chalmers preferred standard 40-44,000 kw tandem compound units with hydrogen-cooled generators. Steam conditions at the throttles are 850 psi and 905 F.

Any extended outage for maintenance of these two units was contingent upon getting a third unit in production and even then, outage time would be limited. The third unit, a 100,000 kw preferred standard General Electric machine with hydrogen-cooled generator and throttle conditions of 1450 psi and 1005 F was put in production April 13, 1953.

Small Maintenance Crew

The two Allis-Chalmers machines had been base-loaded at 52,500 kw for three years and were, we felt, long overdue for a complete inspection and overhaul. With a single shift the best estimate of outage time needed for this first shutdown for these two units was 14 weeks or 7 weeks per unit. Our maintenance crew was too small to split into shifts, and this was to be their first turbine inspection and overhaul. Work on boiler, condenser and other equipment would have to go on simultaneously. It is true we had doubled the plant capacity with the third unit, but we still could not spare the 14 weeks for this outage. In view of these facts, we decided on one crew, ten hours each day and seven days each week, scheduling the entire job for both units in nine weeks.

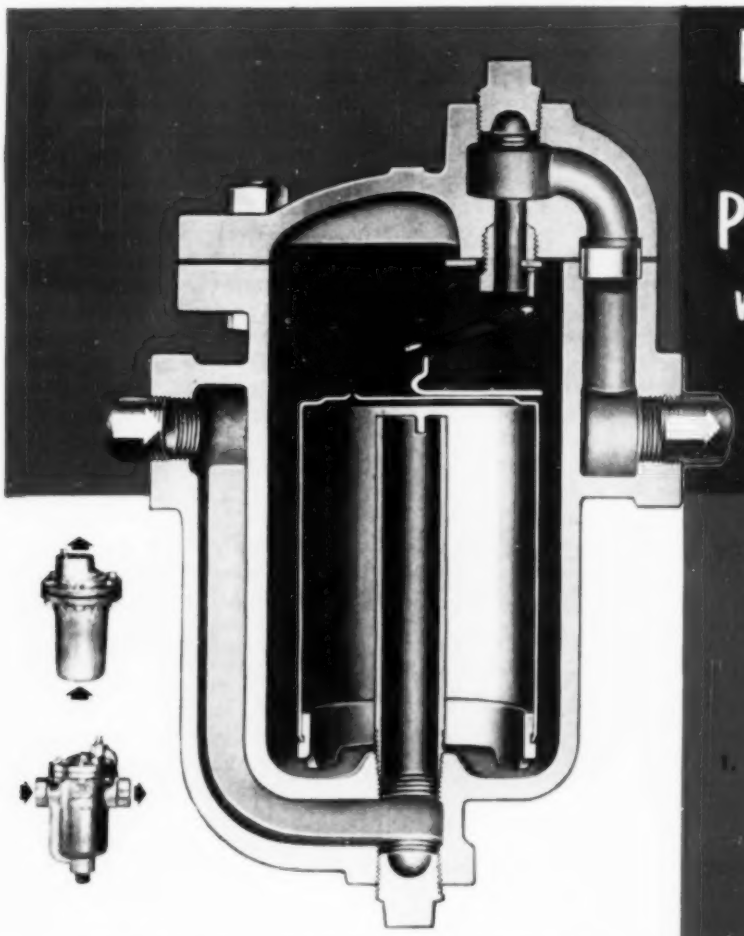
Extensive Preparation

Necessary arrangements were made with the System Operator for the first unit and actual time-out was set. The last three hours before dropping unit from the line, it was run lightly loaded to speed up cooling.

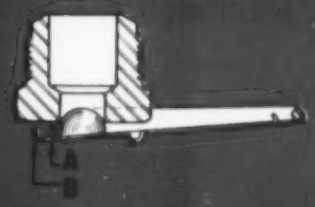
With every hour counting, we gave much thought to preparation. First we covered the tile floor in the work area with paper and plywood. Work benches complete with vises, face plates, small drill press and grinding wheel were set up at convenient places in the work area to reduce the number of trips to the machine shop, one elevation below. Well marked receptacles were conveniently placed to receive small parts and bolts. Tool racks were assembled convenient to the job at hand, complete with tools.

Necessary eye bolts, cable clamps, etc., were placed on racks close to the job. A layout area where parts of the machine could be placed as the unit was dismantled was planned and blocks and cribs were set to receive these parts. Lifting rigs were set in cradles convenient to the crane in order to release the crane promptly for the next lift. All necessary cables and rigging were

MORE TRAP CAPACITY PER DOLLAR with Armstrong two-phase leverage



HOW IT WORKS:



1. Valve in closed position.

2. As the bucket starts to sink, the lever fulcrums at "A", giving high leverage to open the valve against pressure. When valve is well open, the secondary fulcrum "B" touches the face of the valve seat.

3. Additional bucket travel results in fulcrum "B" becoming the pivot, permitting the valve to be opened wider so that restriction to flow of condensate is minimized.

Two-phase steam trap leverage is an original development by Armstrong and has been incorporated in Armstrong traps since the memory of most engineers runneth not to the contrary. It provides:

1. High initial leverage to open the valve against pressure.
2. Secondary lower leverage which permits the valve to travel well clear of the seat to minimize restriction to flow of condensate.

A single-phase lever can open just as large a valve *or* give just as great valve travel, *but not both*. Thus, Armstrong two-phase leverage gives very much greater capacity, depending on trap size than the earlier leverage system.

No steam trap gives greater actual hot condensate capacity, size for size, and dollar for dollar, than an Armstrong!

For complete data call your local Armstrong Representative or send for the 44-page Steam Trap Book.

ARMSTRONG MACHINE WORKS
806 Maple Street, Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

brought up and laid out for convenient handling. Covers for openings during dismantling and assembly were made and stored nearby. We knew we would have to turn rotor and spindle with the turning gear removed therefore an air driven turning rig was placed in a handy location.

Two normal eight-hour days were spent by the maintenance crew in these preparations. The crew was then assembled for briefing and we agreed on crane signals and who would give them and who would not. Crane operator was briefed in details of his job. One man was assigned to have charge of all rigging and all labor was assigned to him. Men were assigned to turbines, generator and exciter. Each group was briefed on their jobs. One man was assigned to the task of keeping the work area clear and clean.

As dismantling of the different parts of the machine had to be carried on simultaneously, jobs were scheduled in order to have the crane available for each lift as needed. Rolling time and cooling time was co-ordinated with other schedules and with the briefing of crew members, we were ready to start dismantling the first unit. Under the supervision of an able factory service engineer, the two machines were completely overhauled in ten weeks.

It was very gratifying to find the two Allis-Chalmers turbines in a very clean condition after three years of almost continuous overload operation. We feel that these fine, rugged machines will run another three years before a second overhaul will be necessary, provided of course, they continue to get clean steam and are properly handled. Our experience on this job shows that planning ahead, scheduling the work and proper preparation will materially reduce outage time for turbine overhauls.

Maintaining Instruments and Controls

(*Comments from Tennessee plant start on page* 72)

prevent air being trapped in the lines. The installation of vent plugs at high points in the lines will permit any air to be bled from the system.

Calibration of **liquid level instruments** can usually be made by observation of the level of the process fluid and depth measurements taken and the instrument adjusted accordingly.

Calibration methods for other types of instruments such as **pH**, **density**, etc. will depend upon the type of instrument. Refer to the manufacturer's service manual for detailed instructions.

The best procedure for maintaining industrial instruments at peak performance is a preventive maintenance program. In setting up such a program, three things are required:

A means of identifying the instruments for ready reference, such as the application and a tag or equipment number.

A record form to permit scheduling and for a permanent record of work accomplished

A schedule to determine when an instrument should be checked and calibrated.

A record form should be devised to fit the types of instruments used and the process conditions. The frequency of calibration and inspection can be determined by studying the installation environment and process requirements.

The time spent in developing and using a preventive maintenance program will be well repaid in having fewer breakdowns and longer life and greater accuracy for the instruments. The size of a factory or the number of instruments in use does not determine whether a preventive maintenance program is profitable. It will pay off in any size plant.

The number and types of instruments in a plant will determine the number of men required, the amount of equipment needed and the size of the work area. Any plant, whether it has one or a thousand instruments, can benefit from proper use and correct maintenance techniques.

Electrical Maintenance Subcontracted—Florida

(*Starts on page* 77)

the electrical contracting company has performed has been eminently satisfactory, may be judged from the fact that it is approaching its thirtieth year of continuous maintenance operation of the plant's electrical facilities.

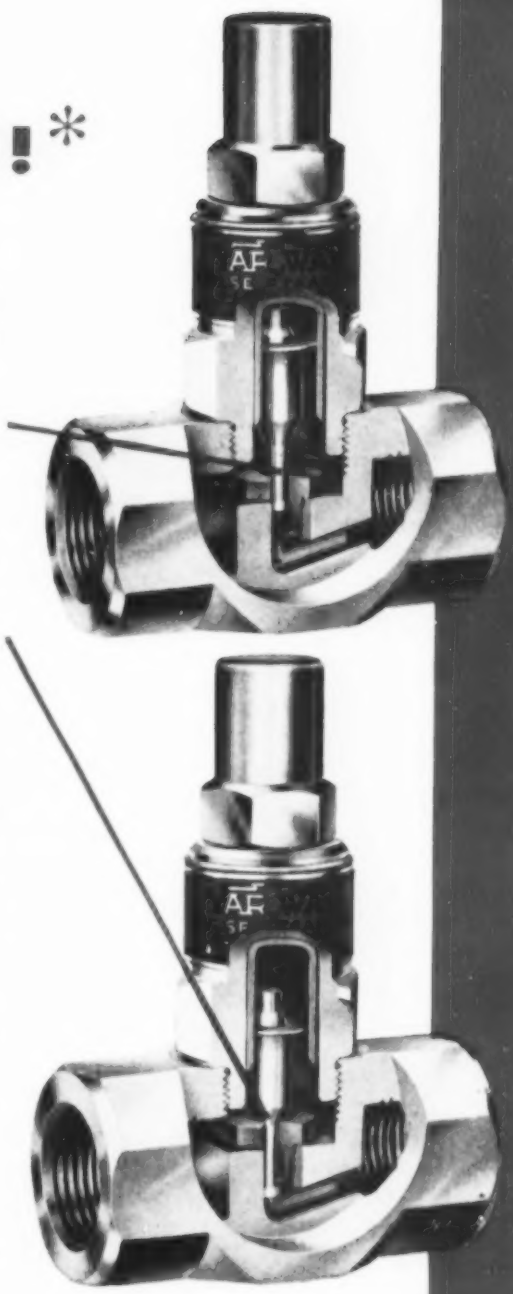
Circuits Watched

Rudy Baacke, owner of Standard Electric Co., says that his 29 years' experience in the Swisher plant has taught him that one of the most important things in electrical maintenance of an industrial plant is constantly to be on guard against overloading circuits. Any shifting of departments, additions of motors or installation of temporary experimental equipment may cause an overload; hence ample capacity for such changes must be allowed and the electrical maintenance man must be consulted before any change is made so that he may be sure the circuit will stand any additional load that may be put upon it. All motors in the Swisher plant are equipped with starting switches as an added precaution.

All banks of transformers are given regular ground tests. The grounding of one would not be serious, but if this happens the wiring is immediately checked so that the grounding does not extend to a second or third.

The maintenance man on duty is required to fill out an inspection chart covering all of the electrical components that must be regularly checked. When it comes to lighting, the time of day, the weather condition and the lighting load are all reported when a monthly ammeter reading is made.

IT FLOATS ON THE LOAD! *



You turn on the steam.

This little stainless steel valve—the only moving part in the Yarway Impulse Steam Trap installed on the equipment—opens wide and *stays* open as the air and condensate continuously pour through.

The equipment reaches production temperature in the quickest possible time.

Production temperature reached, the little valve snaps shut. After that, by a pulsating action, it discharges all condensate as it forms—even a tiny teaspoonful. *There's hot steam in the equipment all the time . . .* steady, maximum temperatures are maintained.

It all adds up—to more production per day.

Other profit-making features of the Yarway Impulse Steam Trap—low initial cost, easy installation, stainless steel construction, low maintenance, good for all pressures, quick delivery from over 200 local industrial distributors.

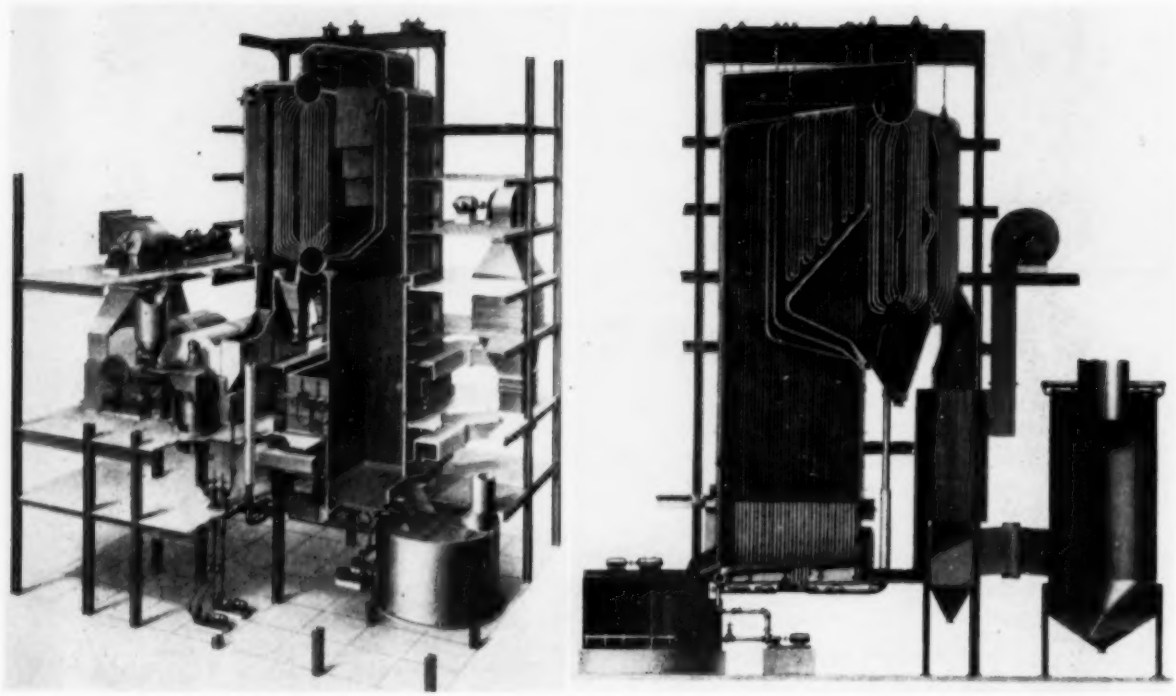
Try a Yarway—free for 60 days—and *prove* its advantage. Your distributor will supply you.

For free Yarway Impulse Steam Trap Bulletin T-1740, write . . .

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.
Southern Representative:
ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

* . . . *resulting in fast heat-up of equipment, more production per day.*

YARWAY | ***impulse steam trap***



Two examples of black liquor recovery boilers.

Photos courtesy Combustion Engineering, Inc., and The Babcock & Wilcox Company.

Modern Blowers and Deslaggers Important in

Solving Boiler Cleaning Problems

By S. F. WALLEZE
Copes-Vulcan Division
Continental Foundry & Machine Co.

OPERATORS have tried everything, including water washing, fuel additives and even boiler modification, to overcome boiler cleaning problems. But soot blowers and deslaggers, properly applied, have been most successful. On existing installations, their record is steadily improving due to newer, more efficient designs. On both new and existing installations, problems are being greatly minimized with better engineering application.

Most boiler cleaning problems can be solved by study and evaluation of the various types of equipment available for specific jobs. Included in such study of each type should be:

1—Effective cleaning range
2—Maintenance records
3—Cost and availability of blowing medium
4—Maintenance involved in source of blowing medium

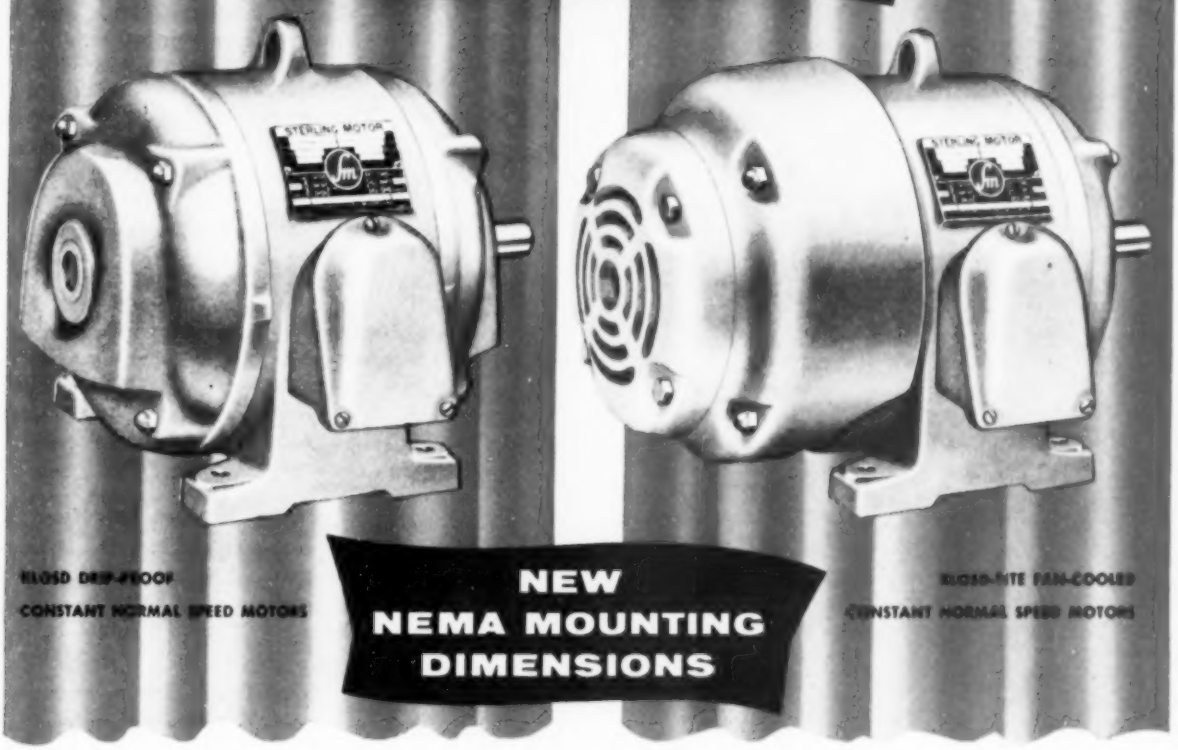
Original capital investment must also be considered. However, there is no economy in buying less equipment than is required. This would sacrifice savings to higher operating, lancing or shut-down costs. A complete boiler cleaning system represents only a very small fraction of the total boiler room investment, and contributes a great deal to efficient operation.

The more effective the cleaning range for each blower, the fewer blowers needed. The fewer the blowers, the lower the maintenance costs for their valves, controls, elements, bearings and replacement parts. Long retractable soot blowers have wide, effective cleaning ranges, and give these benefits. Other factors, such as type and availability of blowing medium, and the selection of air or electric drive, must also be considered.

The amount of air or steam needed to clean the boiler adequately can be given too much emphasis in studying the problem because a clean boiler is the first consideration. While there is an advantage in cleaning quickly, and with minimum blowing steam or air; the fact remains that removing a given deposit will take a

MORE HORSEPOWER... IN LESS SPACE...

with the **NEW STERLING** *Motor Line*



NEW NEMA MOUNTING DIMENSIONS

PLUS...

THESE 10 STERLING ADVANCED DESIGN FEATURES

- Over 50% less inactive space
- Protected construction
- Greater bearing protection
- Advanced design terminal box
- Heavy duty ball bearings
- Herringbone rotor
- Direct-through ventilation
- Increased efficiency and performance
- Stator windings of advanced design
- Improved insulation

WRITE FOR NEW BULLETIN NO. E-433-A

STERLING ELECTRIC MOTORS

New York City 51; Chicago 35; Los Angeles 22; Hamilton, Ont., Canada; Santiago, Chile

certain pressure and volume of blowing medium. It makes no difference whether steam or air is used. In general both clean with equal effectiveness. Depending on the size of the boiler and other conditions, the factor of blowing time must be balanced against that of steam or air consumption per unit of time.

If air is to be used for cleaning, initial cost of compressors and receivers must be considered part of the cleaning cost. So must their maintenance. Against this, maintenance on blowers, packing, piping and valves is lower than with steam.

The time required to complete one blowing cycle depends on the compressor and receiver sizes. The ability to reblow a unit in a dirty boiler section is also dependent on the availability of air supply.

With steam blowing, there is no investment or maintenance cost for compressors and receivers. The cleaning cycle can usually be completed in less time, and any unit can be reblown at will to clean a troublesome area. However, steam lines must be lagged. Maintenance on blowers, piping and valves is somewhat higher than with air.

Selection of the power medium —air or electricity—does not directly affect cleaning except through better speed control. It does affect overall costs over a period of time. Its dependability can indirectly affect the cleaning. If a particular blower or group of blowers is out of service because of motor or control failure, there can be plugging of the boiler section they should clean.

Costs of anticipated and preventive maintenance should definitely be evaluated before any cleaning equipment is purchased. Figures are available from operating records, and from experience of other nearby plants using similar units under similar conditions.

Recovery Boilers

When soot blowers were first applied to chemical recovery units in paper mills, common practice was to use steam-blowing, hand operated, rotary type, fixed-element blowers. This offered some mechanical aid to supplement hand lancing, but over-all results left much to be desired.

In general, boiler operating pressure was comparatively low. Element and nozzle design had not been perfected. Application of blowers to recovery units was not understood.

After some years, an air-blowing system was introduced. It used higher nozzle pressures than had been available with steam. In the meantime, there had been much research on nozzles, element materials and blower locations. There had been improvements in recovery boiler designs and materials. This permitted automatic air-blowing systems to build up a backlog of more satisfactory cleaning results than with rotary steam-blowing systems.

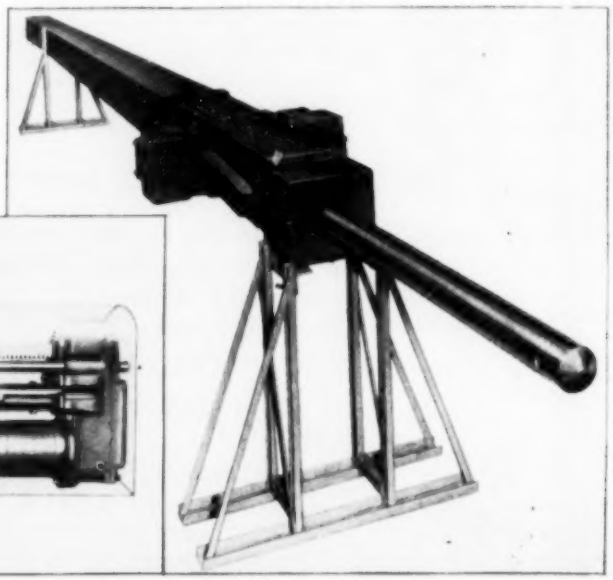
More recently, the long retractable soot blower was introduced on recovery boilers. They permitted cleaning superheater and screen-tube areas where fixed-element rotary blowers were ineffective or presented serious maintenance problems. This greatly reduced the amount of hand lancing—in some cases it was entirely eliminated. There were added benefits from the more effective cleaning by the long retractables. Superheater temperatures were increased. This resulted in increased boiler and turbine efficiency.

Because of these things, when practicable, it is frequently economical to use long retractables throughout a recovery unit, rather than to combine retractable and rotary systems. Such standardization simplifies maintenance for plant personnel, and often decreased ultimate overall cost.

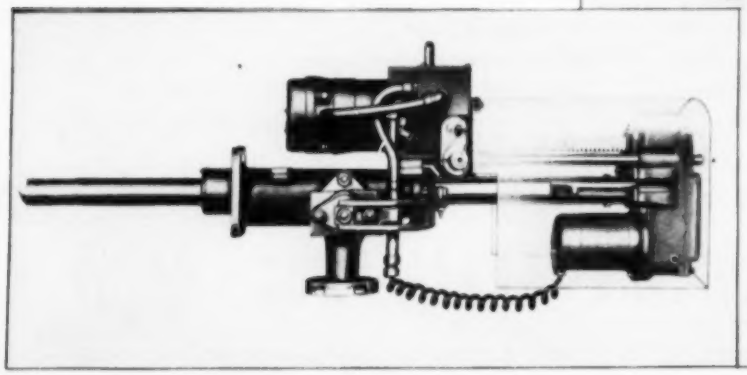
Power Medium Selection

The selection of air or electric drive should be made after a study and evaluation of costs and conditions in the individual plant. Generally, air and electricity are

Vulcan T-30 long retractable soot blower, with electric drive, will extend and retract more than 30 ft.



Vulcan wall deslagger, with electric drive. Protective cover shown in phantom.



Your copy is ready

...PIPING FOR PERMANENCE

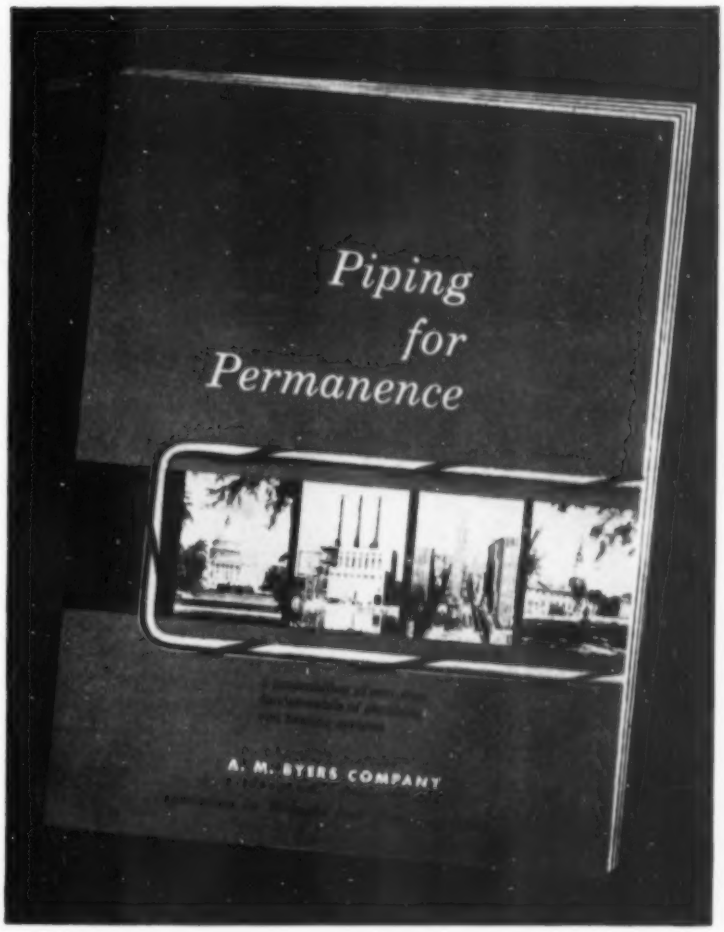
The nature of piping problems in heating and plumbing systems, and the methods by which they can be solved, are discussed in detail in this 32-page Bulletin.

Prepared by our Engineering Service Department, this Bulletin is based on the information we have gathered from analysing complete data on thousands of piping installations of every type, under all kinds of conditions. This pool of experience has been condensed between covers in a clear, easily followed story to help you realize greater piping economy in your installations.

The bulletin also includes a roundup of wrought iron pipe installations from every part of the country and presents practical evidence of the results obtained from the use of the material. These past service records are providing leading engineers everywhere with a practical guide for today's selection.

Your copy is ready. Write for it today.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Dept.: New York, N.Y.



You'll find information on:

Requisites of a piping system—brief review of piping material properties essential to long-life, economical service.

Building-piping systems—definition of individual services; brief discussion of conditions that threaten service life in plumbing and heating systems and solutions; fundamentals of design and installation that may be used to reduce the rate and severity of corrosion.

Water and water problems—background facts on interpretation of water analysis and water treatment.

How Byers can help you—available data on piping installations to solve individual problems; how you can benefit from the records of our Engineering Service Department.

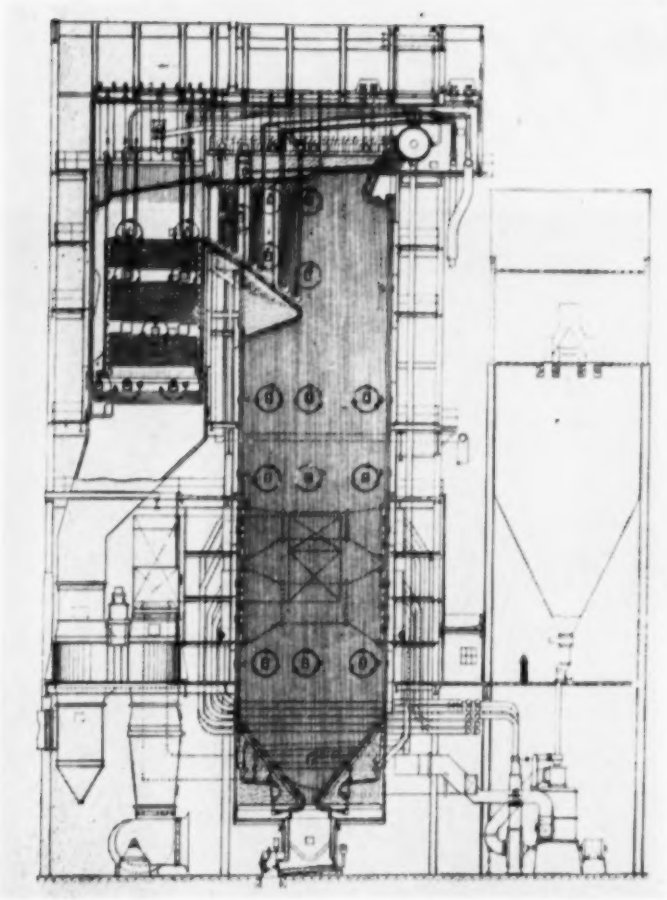
BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS



High-duty steam generator on order for Southern utility plant.

equally dependable as a power source, although the use of electrically driven equipment is gaining favor.

The power medium selection should be based to some extent on the controls involved. Since the cleaning of recovery boilers is distinctly different from power boilers, the blower controls should be designed to operate dependably under the difficulties imposed by recovery room atmospheres.

In some cases, where air is normally used for blowing, standby steam is available in case of compressor failure. This is accomplished by inserting a shut-off valve and a short header to the steam supply. There is 100% soot blower availability at all times if the blowers and controls can use either air or steam with no change in the blowers themselves. Steam blowing is now giving more favorable service than in the past, although maintenance on comparable air-blowing soot blower equipment remains slightly lower.

Utility Boilers

Rules for determining wall deslagger locations are now fairly well standardized. However, cleaning results vary considerably, depending on boiler load, blowing pressure, nozzle design, speed of element rotation, quality of fuel and frequency of blowing. 200 psig is generally considered the optimum nozzle pressure for effective wall cleaning. On reheat boilers, some experience indicates that certain coal slags respond to nozzle pressures as low as 125 to 150 psig, others as high as 300. Such cases are the exception, not the rule.

The wall deslagger, through its cleaning ability, can aid superheat control. An automatic wall deslagging system now in use takes its starting impulse from the reheat temperature control, set just ahead of where desuperheating water would normally be introduced. As the walls are cleaned and the controls come back, the system automatically stops until needed again. Remote hand operation is possible at any time during the automatic operation. This gives maximum flexibility and control for effective wall cleaning.

The fixed-position rotary soot blower is not effective for slag removal from radiant surfaces of coal-fired or oil-fired utility boilers. The long retractable is the only blower that will do an adequate cleaning job.

Tests have shown that a long retractable will remove virtually any type of slag deposits on severe cleaning jobs. Nozzle pressures must be adequate, and the blowers must be operated frequently. In general, decreasing the rotating and traversing speeds improves the cleaning results. Decreasing the speeds increases the time needed to complete one blowing cycle, so that blowing-medium consumption increases. However, the rate of consumption may be decreased. The increase in time and the decrease in consumption rate often balance each other. Under certain conditions, there can be better boiler cleaning with the same consumption of blowing steam or air.

The long retractable cleans better, and over a wider range, than stationary rotary blowers. The number of soot blowers is often reduced. The retractables can be located for optimum cleaning, without regard for temperatures to be encountered. The saving in element replacements in one year is often enough to pay for the long retractables. Being fully automatic and self-contained, long retractables can be converted to automatic-sequential systems at nominal additional cost.

Each plant, of course, has its individual problems. Help in solving them can be had from operat-

(*Continued on page* 137)

There is a difference in return bends—

Making a seamless return bend is no simple task. Holding it to the unvarying accuracy and metallurgical uniformity found in 180° WeldELLS® is a feat that could be accomplished only by the organization that pioneered the seamless return bend and perfected it through a quarter century of specialization.

Every WeldELL return bend gives you exactly what you ordered: true roundness, accurate size, full pipe thickness from end to end . . . controlled quality all the way through. No fitting tells the WeldELL story better than the return bend. There IS a difference!

And there IS a difference in *all* Taylor Forge Welding Fittings. It is a difference that is particularly important now that fittings made to low standards have come into the market. Today the best way to be sure you are getting welding fittings of highest quality, conforming to all codes and standards, is to specify Taylor Forge WeldELLS.

WeldELLS—the *first* complete line—is still the *most* complete line, in range of types, sizes, weights, materials. For up-to-the-minute facts see your Taylor Forge Distributor.

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS, General Offices and Works: P.O. Box 485, Chicago 90, Ill.

Offices in all principal cities. Plants at: Carnegie, Pa.; Fontana, Calif.; Gary, Ind.; Hamilton, Ont., Canada

Plant maintenance—another job for versatile handling equipment . . .

FORK-LIFT TRUCKS Handle Many Jobs

WHAT kinds of material handling equipment are being widely used in plant maintenance work? Is the equipment specifically assigned to this maintenance department or must it be borrowed during off-hours from the production department?

What types of maintenance jobs are being performed by material handling equipment? Are there any general types of maintenance work in which material handling equipment fits naturally?

TO EXPLORE the profitable employment of material handling equipment in the industrial plant maintenance field, the Material Handling Institute (composed of 79 manufacturers of material handling equipment), recently polled its members. Replies were based not only on their manufacturing facilities but also on their customers' plants.

The survey showed a great number of unusual maintenance jobs now being done more effectively through use of material handling equipment. Many of the ideas can be successfully adapted for use in your plant.

Textile Mill — A carding machine weighing 9 tons had to be moved from its old site 15 ft off the floor to a new location. Instead of timbering and lowering with jacks, four fork-lift trucks were borrowed from the production department. Using two on each side of the carding machine, it was raised high enough to remove the steel supports. Then the fork-lifts lowered the machine almost to the floor, transported it to the new site and set it on the new anchor bolts already prepared.

Metalworking Plant — Production machines in this plant are periodically completely overhauled. Formerly, machines were disassembled at the machine site, parts transported to the maintenance shop for repair, the entire machine reassembled in the maintenance shop for testing, then disassembled for carrying back to original site and then reassembled. Now, a fork-lift truck picks up the entire machine and carries it to the maintenance shop where it is disassembled, overhauled, and reassembled. After testing, it is taken back to original site. One complete disassembly and assembly was eliminated.

Chemical Plant — Heavy metal rolls are taken from blending mills with a fork-lift truck and carried to a lathe for repairs and resurfacing. Hydraulic controls of fork-lift permit precise placement of the roll in the lathe.

General Manufacturing — Fire-fighting equipment is kept on a pallet or skid and is quickly taken to the location of the fire by fork-lift truck.

Rubber Plant—The maintenance department in this plant has 2 hand trucks for carrying tools and parts in addition to powered equipment. The platform of the truck has been covered with Ruff-Top conveyor belt to prevent tools from falling off and to protect platform against wear. This same company uses an automotive truck equipped with a winch and a three-legged gin pole to handle material in a storage warehouse.

Here, again, heavy metal rolls from rubber mills are removed, transported and placed in the lathe by fork-lift.

Heavy Manufacturing — In remodeling part of a plant, it was at first thought that timbering and jacks would be required to lift a heavy I-beam into place. A heavy-duty fork-lift with a high-lift extension, however, picked up the beam, carried it to the spot, raised it and held it in position while it was bolted securely.

Plant Clean-Up — A fork-lift truck with a special hopper picks up metal chips from production machines and also collects garbage from the plant cafeteria.

Refrigerator Warehouse—A standard fork-lift truck is equipped with an extra set of masts to enable the maintenance department to repair ceiling pipes. The extra masts are easily removed when truck is returned to normal use.

Monorail Repairs — Fork-lifts make maintenance on a monorail conveyor system easy. When extensions or removals in the system are required, the fork-lifts save time.

Other Applications

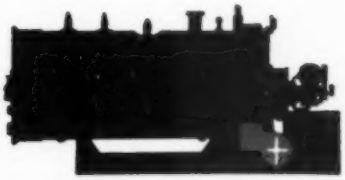
The poll indicated a rather wide-spread, general use of material handling equipment, especially fork-lift trucks, in the maintenance of the plant structure and non-production fixtures. A large majority stated that fork-lift trucks with extra masts and a special platform were used for replacing fluorescent lighting tubes

(*Continued on page* 137)

HOW SUPERIOR SOLVES YOUR STEAM PROBLEMS

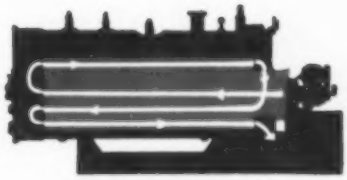
A COMPLETE PACKAGE

Completely factory-assembled and tested, a Superior Steam Generator is backed by undivided responsibility.



INDUCED DRAFT THAT'S BUILT-IN

... eliminates need of an expensive chimney ... Multiple fans draw evenly on all tubes, reducing maintenance.

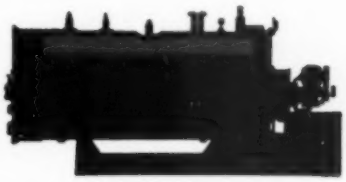


4-PASS, DOWN-DRAFT DESIGN

High gas velocities produce high efficiency. Down-draft design promotes rapid evaporation, quicker steaming.

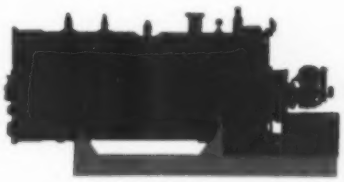
AMPLE HEATING SURFACE

A minimum of 5 sq. ft. of heating surface per boiler horsepower assures maximum efficiency at full rated capacity.



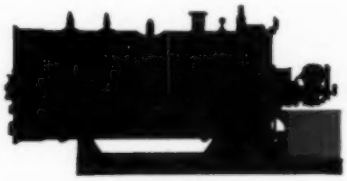
RESERVE CAPACITY

Greater steam space and large evaporating surface provide ample reserve capacity & better than 99% dry s. am.



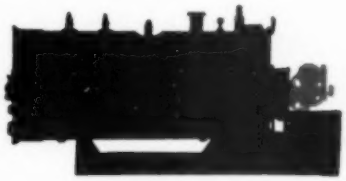
NO EXPENSIVE FOUNDATION

Built on a rigid channel iron base, a Superior Steam Generator needs only a floor capable of supporting its weight.



BUILT-IN CONTROLS

All controls essential to completely automatic operation are factory-wired into an easily accessible control panel.



BURN OIL, GAS, OR BOTH

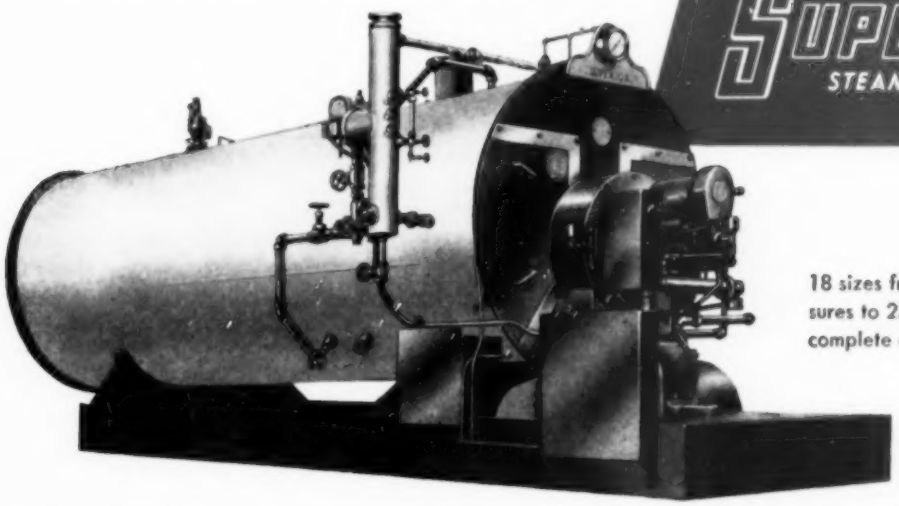
Superior Burners burn oil or gas or a combination of both ... changing from one fuel to the other in seconds.

Superior Steam Generators are the ideal choice for a new steam plant ... the simplest answer to expanding your present plant ... the easiest solution to replacing obsolete boilers.

Guaranteed to develop maximum rated capacities at thermal efficiencies in excess of 80%, their design embodies features which insure long-lived dependability and maximum fuel economy.

for performance you can **BANK** *on*

SUPERIOR
STEAM GENERATORS



18 sizes from 20 to 600 b.h.p. for pressures to 250 p.s.i. or for hot water. For complete details write for Catalog 611.

SUPERIOR COMBUSTION INDUSTRIES INC. TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

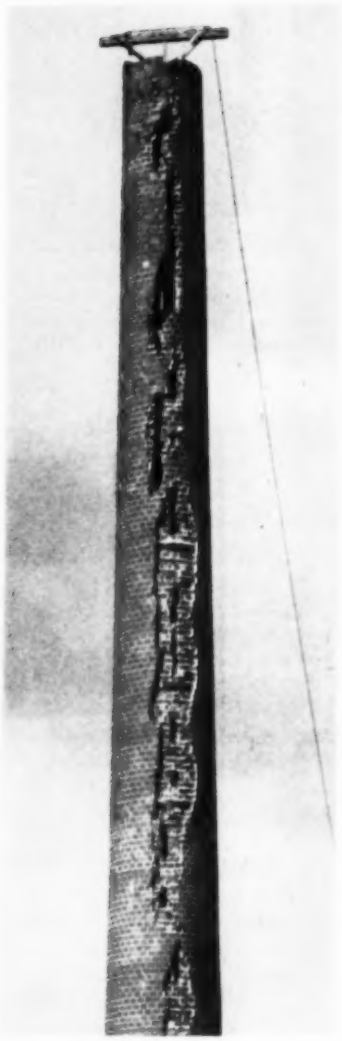
When Does Deterioration Start?

When Should Damage Be Repaired?

YOUR CHIMNEY

By CLARK NICHOLS

Vice President in Charge of Maintenance
International Chimney Corporation



Lightning damage

THE masonry or steel chimney is a special structure built for a special purpose. Its physical and chemical exposures are different from conditions encountered anywhere else in the plant. It is usually a vertical cylinder or rectangle built high above surrounding buildings, making a heavy, concentrated load on a small foundation. It has to be designed to withstand wind pressures and it must handle gasses of entirely different chemical content and temperature than surrounding gasses present in the air.

This article is not a treatise on the technical aspects and causes of deterioration of chimneys, but rather a general discussion of what the plant manager may do to forestall expensive repair costs and possible plant shutdowns due to chimney failure. In view of the varying weather conditions encountered in chimney operations, as well as gas temperature and chemical content, construction and operation, it is natural that chimney deterioration will follow many trends. The greater portion of repairs may be due to normal weathering and deterioration, or to the particular service to which the chimney may be subjected.

Inasmuch as the chimney may be of brick, reinforced concrete or steel, and the process of deterioration will vary in each case, it is well to consider each type separately.

Brick Chimneys

Chimneys may be made of radial brick, common and face brick, or tile.

The deterioration of radial brick chimneys, under normal conditions, will usually start at the very top of the chimney. Smoke discharging from the chimney will curl around the upper portion and deposit soot on the chimney wall. This soot, coming in contact with moisture from surrounding air, will form a weak acid which normally will attack the lime in the mortar joints.

This disintegration of mortar joints should not be great during the first five or ten years of the life of the chimney unless there is an excessive amount of lime in the mortar. In this event, mortar joints will weather more rapidly. Ordinarily such deterioration is confined to the upper 10′ or 15′ section of the chimney, and will be indicated by blackening and darkening of mortar joints. This condition is best noted where the sun strikes the chimney, causing deep shadows in the mortar joints.

Concrete watertables or washes on top of chimney heads and projections, placed there to prevent seepage of water into the brickwork, will sometimes crack and have a tendency to shift outward over the projections themselves. This condition may be noted by darkening shadows over the top of the chimney. However, where there is a fly ash condition, such

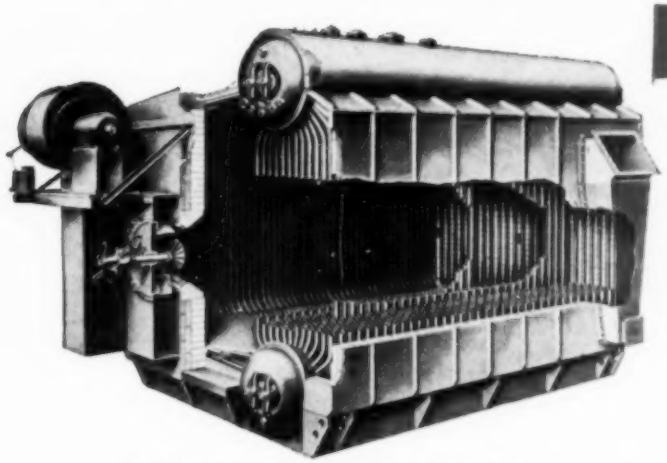
FOR STEAM CAPACITY up to 60,000 POUNDS

Choose your boiler from these two

If you burn oil or gas, investigate the VP Package Boiler for capacities up to 30,000 pounds per hr . . . the VU-10 up to 60,000 pounds.

For stoker firing, the VU-10 is available from 10,000 to 60,000 pounds of steam per hour.

Whatever your fuel . . . whatever your steam capacity requirements up to 60,000 pounds per hour — you'll find that one of the Combustion Engineering Boilers described below will be just right for you.



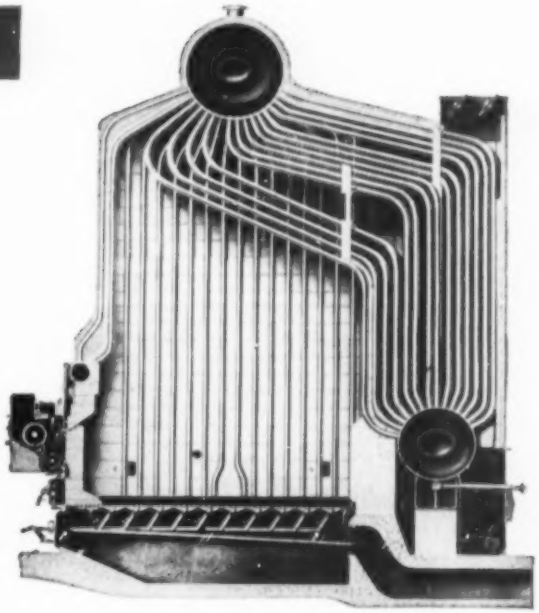
The VP Boiler — the Package Boiler with EXTRA Features

THE VP BOILER

The C-E Package Boiler, type VP . . . completely shop-assembled . . . for oil or gas firing. It is available in capacities from 4,000 to 30,000 lb steam per hr; for pressures to 250 psi. The VP Boiler has more water-cooled area per cubic foot of furnace volume than any other boiler of its size and type. The large (30-in. diameter) lower drum permits a simple, symmetrical tube arrangement . . . greater water storage capacity . . . easy access for washing down or inspection. The centrifugal fan is efficient, yet its noise level is less than half that of typical high-speed blowers used on most package boilers. Baffle arrangement is simple, resulting in low draft loss . . . simple soot blowing . . . elimination of dead pockets . . . high heat absorption.

THE VU-10 BOILER

The VU-10 Boiler is designed for industrial load conditions, particularly for plants with small operating and maintenance forces. Capacities range from 10,000 to 60,000 lb steam per hr . . . pressures to 475 psi . . . heat recovery equipment is available if desired. Fuel can be either coal (C-E Spreader, Traveling Grate or Underfeed Stoker) oil or gas. This boiler is a completely standarized design adaptable to many conditions. It responds readily to variations in load; it is simple to operate and maintain. All parts are easily accessible for inspection. Like the VP, the VU-10 Boiler is a complete unit — boiler, furnace setting, fuel-burning equipment, controls, forced draft — bringing you the benefit of one contract . . . one guarantee . . . one responsibility.



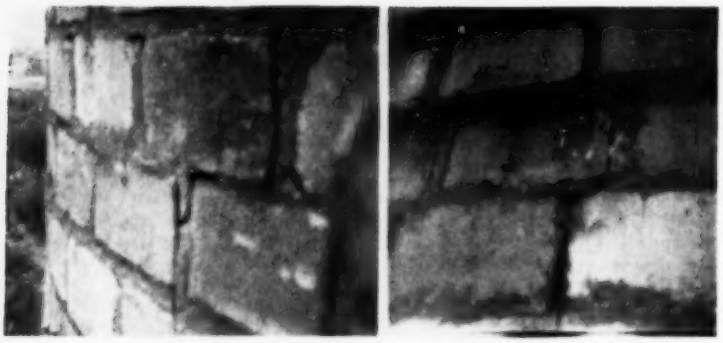
The VU-10 Boiler, as arranged for C-E Spreader Stoker firing

COMBUSTION ENGINEERING, Inc.

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT

B-6898



Weathered mortar joints and stress cracks in brick chimney.

ash may build in a cone on top of the chimney wall to a height of 12" or more and will be very uneven on top. Such ash should be cleaned off periodically but, in itself, is not an indication of deterioration.

There are also several special conditions, which may cause undue deterioration and are in reality "danger signals" which may lead to serious deterioration if not given early attention. Usually these danger signals may be caused by the following:

1. Extreme storm conditions.
2. Boiler explosion, or soot fires in the base of the chimney.
3. Uneven operation (where chimney may be out of service for several months).

In the event of such occurrences, the plant maintenance superintendent should inspect the following items on the chimney, visually, with or without binoculars.

After serious electrical or wind storms, the lightning rod system should be looked at to see if there are any breaks in the cables. If it is noted after a storm that a lightning rod point is bent or has pulled away from its anchorage, this is an indication that the system may have received a moderate or heavy charge which has been grounded by the system.

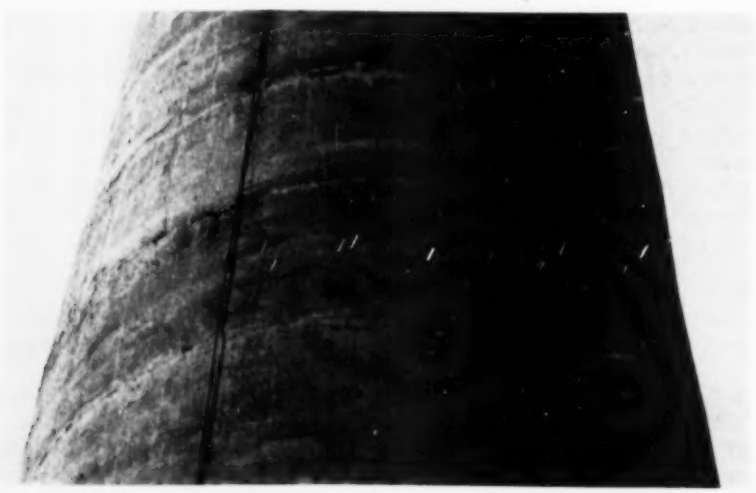
Should the lightning bolt have been too heavy to be carried away and grounded by the system, vertical stress cracks may also appear in the very top of the chimney. Lightning damage cracks will usually follow a straight vertical line, breaking through brick and mortar joints. There may also be broken brick or spalled brick faces around lightning rod and cable anchors. Should there be evidence of such a result after a storm, the chimney should be carefully examined for further hidden evidences of damage by a competent chimney maintenance engineer.

Incidentally, most chimneys built between the years 1940 and 1946 had galvanized steel lightning systems installed because of scarcity of copper at that time. These galzanized systems had a maximum life expectancy of around ten years, and installations older than that do not provide adequate protection.

Boiler explosions and soot fires in the base of chimneys will cause formation of cracks around the chimney at the level of the flue openings or below. These cracks most often follow lines of mortar joints rather than breaking through brick, unless such a fire or explosion is intense. Such stress cracks may not be greater in width than ⅛" or about one third of the width of normal mortar joints. Should such cracks be found, the lower part of the inside of the chimney should be inspected to find indications of spalled brick or damaged mortar joints.

When a chimney is out of service for several months, there is a tendency for mortar joints to deteriorate both inside and outside the chimney, particularly at the top, because there is no heat to prevent condensation of moisture from the air. When placing the chimney back in service, it is best to increase heat slowly, so that the brick will have time to expand gradually. Otherwise, cracks will form in the sections of the chimney above the lining.

Deteriorated concrete chimney



Concrete Chimneys

The causes of deterioration in concrete chimneys are much the same as for brick chimneys. However, the effects are somewhat different. A reinforced concrete chimney, being more or less of a monolithic structure, will not show as much evidence of deterioration. This does not mean that the deterioration is not there, but it means that the deterioration is more even throughout the chimney and therefore deterioration is not so noticeable as in brick chimneys.

Other than the previously men-

here's how high temperature piping can flex its muscles

Each pipe hanger is scale tested to rigid tolerances by a skilled workman at the Navco plant. After final assembly and inspection, the hangers are carefully crated and readied for shipment.

NAVCO *Counterpoise* Pipe Hangers

Since high temperature piping has no respect for equipment connections, the entire piping system must flex its muscles to absorb the strain of expansion and contraction. This prevents serious stresses that could endanger the installation.

And how does high temperature piping flex its muscles? With Navco's precision engineered Counterpoise Pipe Hanger—the hanger with a load-supporting effort that is of constant value throughout the range of travel. This permits weightless movement of the entire piping system.

To learn how power plants, oil refineries and chemical plants can have piping systems that flex their muscles, write today for Navco's 12-page Counterpoise hanger bulletin #153.

NAVCO

NATIONAL VALVE & MANUFACTURING COMPANY

3106 LIBERTY AVENUE, PITTSBURGH 1, PENNSYLVANIA

New York • Chicago • Cleveland • Boston • Atlanta • Buffalo • Cincinnati

Chimney Maintenance

(*Starts on page* 100)

tioned lightning rod system breaks, the damage from weathering of concrete chimneys will usually follow the same pattern. When a chimney is built, it is usually given a cement wash while the concrete is green. This wash theoretically integrates itself into the concrete wall and covers the wall, forming a smooth, water-resistant surface.

If this wash is not properly applied, normal weathering will cause the wash to disintegrate, leaving the chimney surface in a roughened condition. Even where the wash is properly applied, weathering will ultimately result in the same condition. As this weathering continues, moisture will continue to seep into the wall from the outside surface. When it reaches the reinforcing rods imbedded in the wall, the rods rust, ultimately spalling the outer surface of the concrete and eventually exposing the reinforcing steel.

Many reinforced concrete chimneys show definite horizontal lines where construction daily pours stopped. If the next day's pour was carefully slushed in place, the line will be unnoticeable, but if it was poured without cleaning the joint, a horizontal crack will form. Such joints must be watched carefully and if there is a tendency for areas around these cracks to weather, the cracks should be taken care of.

Steel Stacks

Steel stacks may be divided into two types — (1) guyed unlined stacks and (2) self supported stacks, either lined or unlined.

Guyed steel stacks are usually of a much thinner metal than self supported stacks—and therefore have a shorter life expectancy. With regular brushing and painting, however, the life of a guyed stack may be extended considerably. Evidence of deterioration, of course, is formation of rust spots and deterioration of angle rings at the top of the steel stack.

Self supported stacks, being heavier, do not have the same rate of deterioration as the guyed stacks, but signs of deterioration are much the same.

Repair Service

Any work on the chimney should be taken care of by an experienced chimney construction and maintenance company. You should check the company as to financial responsibility, their insurance coverage, and their locations with reference to your plant (for emergency service). Progressive repair organizations may usually be identified by their approach, their advertising, and their claims.

Several reliable companies will furnish a periodic visual chimney inspection without charge. Such inspections are made by experienced engineers and you are given a report of the condition of the chimney, whether it requires attention, and if necessary, a quotation. Usually these inspection requests are held until a number are in the same area, and then all inspections are made at that time.

This brief article has attempted to provide the plant maintenance engineer with an idea of how and where chimney deterioration will start and how he may determine when the chimney should be repaired. It will also assist him in evaluating any chimney repair quotations that may be received.

Scale Removal—Texas

(*Starts on page* 70)

to quickly remove the solutions, the contractor does not have to use so much extra equipment and men, and spends less time on a job. Since they are specializing on chemical treatment, we have by experience found that we should not go too far afield in the other fellow's line of work. So, with this approach, we have reduced the specialist expense of doing our cleaning jobs and therefore, this saving has been passed along to us.

To indicate how this is done, we had six boilers that Dowell cleaned twice for a fixed figure per boiler. To introduce and empty acid they provided hose, fittings and pipe, making temporary connections. This required one extra man and a truck to handle the equipment.

After we decided a quicker job could be done by making permanent connections with our crew, the contractor was able to save one truck and a man so their charges for the next job were less, and enough less to pay for the permanent job we had done. In fact, we showed a net gain after paying for the permanent connections.

The Rube Golberg temporary connections for water, steam, air and chemicals are no longer in use. Their trucks and men are not tied up for the long periods making and taking out the temporary connections.

Conveyor Belts

(*Starts on page* 86)

year or two is well understood by most maintenance men and seldom do we see exuded grease on the under cover. But this word of caution may help in some few cases.

New Belt Materials

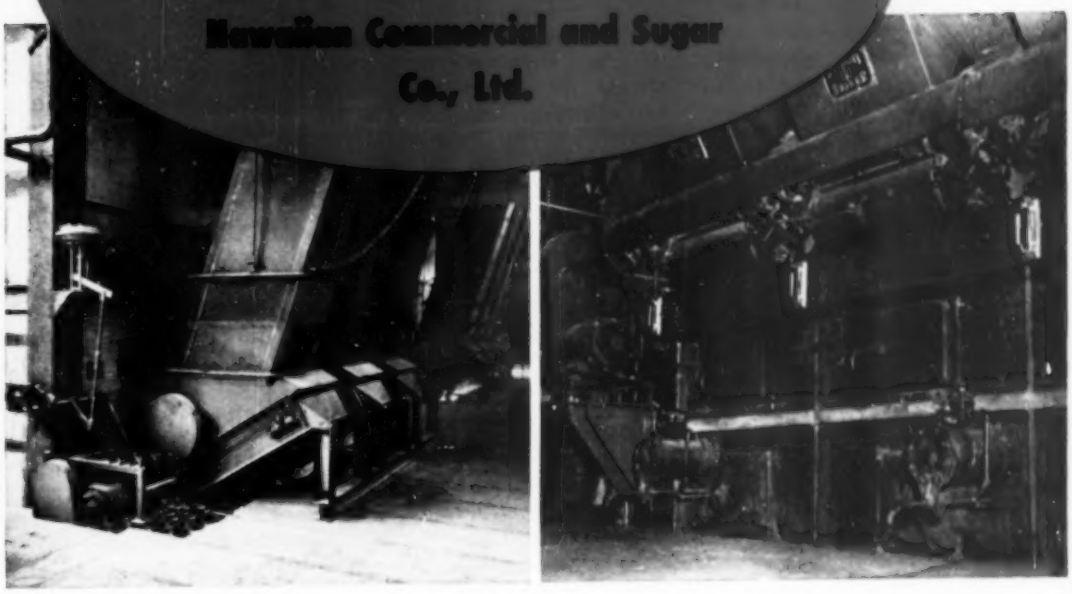
There have been striking changes in conveyor belt design in the past few years. Along with the use of synthetic rubber as a cover and binder there is much interest in the possibilities of synthetic fiber as a substitute for natural cotton fiber in duck and cords. Rayon has the advantage of much greater strength and cotton costs are going up while rayon cost is coming down. Even now it is possible to attain a given strength with rayon at less cost than with cotton.

One drawback has been the difficulty in getting adhesion to the smooth rayon fibers, but this problem has been solved. More difficult is the decrease by as much as 40% in rayon strength when water-soaked, as contrasted with cotton which gains slightly.

Nylon has even greater possibilities from a strength standpoint. It has excellent aging qualities and resistance to mildew. Elasticity is its drawback. It stretches under tension and grows in length with time and so must be used in combination with cotton duck. Just how these belts will stand up we do not as yet know.

"OPERATION BAGASSE"

DETROIT ROTOSTOKERS AN OUTSTANDING SUCCESS BURNING BAGASSE AT Hawaiian Commercial and Sugar Co., Ltd.

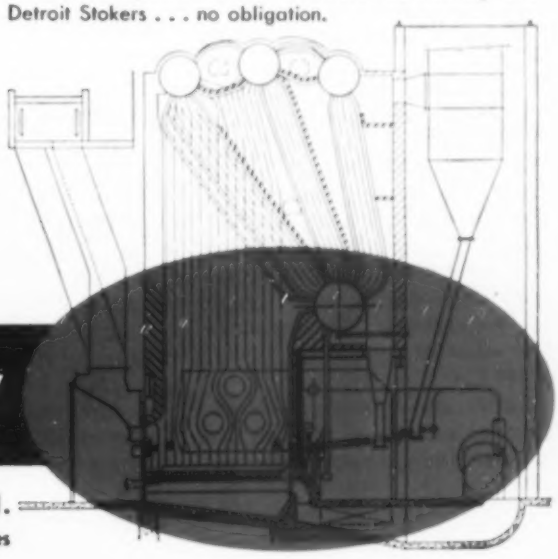


Bagasse Burning Detroit RotoStokers are outstandingly successful in burning Bagasse in the plant of the Hawaiian Commercial and Sugar Co., Ltd., Punnene, Maui, Hawaii.

Equipped with special feeders, they handle the Bagasse continuously and distribute it uniformly in each furnace. No coal or other supplementary fuel is needed. The stokers have steam power operated dumping grates. The boilers are Babcock and Wilcox Stirling type with water cooled furnaces. Design capacity of 50,000 pounds of steam per hour at 160 psi saturated per unit when burning Bagasse only has been exceeded.

Our Spreader Stokers are built to burn many types of refuse fuel, including Bagasse, wet and dry wood bark, hogged wood, spent coffee grounds, paper mill refuse, corn cobs, etc., separately or in combination with all grades of Bituminous Coals or Lignite.

Write for special booklet on Refuse Fuel Burning with Detroit Stokers . . . no obligation.



DETROIT SINCE 1898 STOKERS

DETROIT STOKER COMPANY

GENERAL MOTORS BLDG., DETROIT 2, MICH.

Works at Monroe, Mich. • District Offices in Principal Cities

Electronic Tube Maintenance

By L. W. FITZPATRICK,
Chief Engineer Department of Corrections, Jefferson City, Missouri

INDUSTRIAL electronic tubes are built rugged for the strenuous operating requirements encountered in plant operations. However, installation and re-installation of moved electronic equipment should always be double-checked for proper tube position which materially extends tube life, reduces outage and maintenance.

Vertical mounting is the preferred position and any type tube may be operated safely with the base, the filament, or the cathode downward. Many tubes may be mounted horizontally if there is no severe vibration. The mounting position should be checked, so that the moderate sagging of the tube filaments will not contact and short-circuit nearby grids and plates.

High power thyratrons and phanotrons must be mounted vertically for ample air cooling. The hot cathode end should be downward, for effective cooling.

Mercury-vapor tubes including many thyratrons and phanotrons must be mounted vertically with the base and cathode downward so that condensed mercury will collect in the tube end.

Mercury pool tubes including ignitrons have to be mounted vertically, to keep the mercury pool in correct position and evenly distributed at a uniform depth over the bottom of the tube.

Constant operating temperature prolongs tube life more than any other factor. For every tube, manufacturers have established ambient temperatures which should not be exceeded. The maximum safe value for general use is 40 C, or 104 F.

Temperatures should be checked near the cathode or filament end, or near the cathode base junction with the envelope of glass tubes. Thyratrons can misfire with high temperatures. Mercury-vapor types have low temperature limits.

The sudden cooling of high-power tubes can crack or break the glass envelope. Tubes should always be protected from mist and any spray, and should be protected against cool metallic objects touching the tube glass. Wiring and other conductors should be kept from the vicinity of high-frequency power oscillators as glass puncture can occur.

In cooling a relatively large air flow at moderate temperature is better than small low temperature air flows. The cooling stream should never directly hit the tube, particularly mercury-vapor types, as the mercury will condense in the upper end, and in falling between elements to the bottom cause short circuits.

Tube chimneys, which are loose fitting tube shields, are efficient air circulators speeding heat transfer. Thermostatically controlled strip heaters and shutter fans permit uniform tube and cabinet temperatures.

Older style control cabinets can be modernized and air cooled with inexpensive kitchen-type fans, thermostatically controlled, with a suitable filter for the incoming air.

Tubes should not be subjected to **vibration or sudden shocks** which displace internal elements and may break welded internal connections and supports. Shock absorbing mounts, at the tubes and cabinet supports, extend tube life.

Correct voltage should be applied to the filaments or heaters at all times. Excessive voltage shortens tube life because the active electron emitting material will be evaporated faster than required. Low voltage makes the temperature of the cathode or filament inadequate to supply proper emission for operation.

Filament voltages should preferably be a-c rather than d-c, and should not exceed tube specification voltage plus or minus 5%, unless tubes were specially designed for widely fluctuating voltages. A series resistor will keep filaments semi-constant under voltage fluctuations. Constant current transformers should be used in critical circuits.

Sockets should be regularly checked for firm, low resistance contacts with tube terminals. Dirty tube terminal contacts or dust in air passages cause excessive heat and short life. Air cleaning pays dividends. A second blow is helpful to completely remove dust that may settle on relay contact points after the initial blow.

Overload relays and circuit breakers in the tube filament and control circuits should be carefully adjusted and continuously maintained at manufacturer's specified rating.

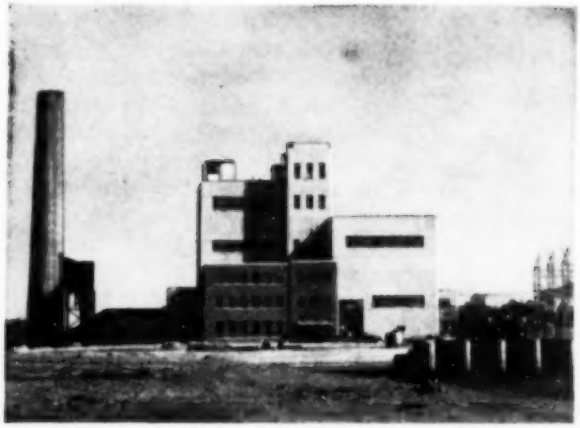
Operating within ratings, correct filament voltage, good cooling, properly adjusted overload settings, and clean cabinets provide long, trouble-free service to vacuum tube and associated equipment.

Portable Electric Welder Connections

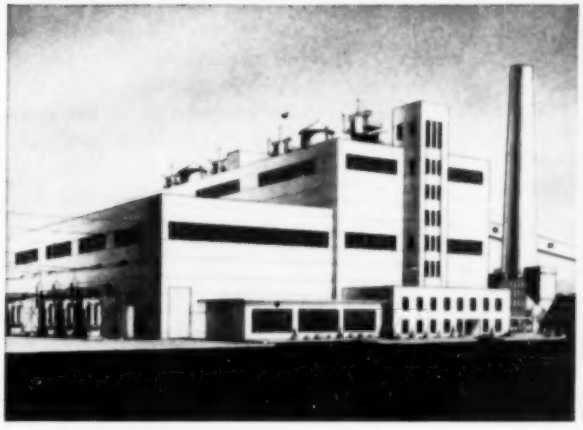
PORTABLE electric welders often present a connection problem. Many industrial plants have put up a receptacle for the machine connections but in time the plugs and receptacles are damaged or lost. The electrician then has to follow the welder to hook up the machine.

In our paper mill the plug and cord are fastened to the station with a circuit breaker on each cord and the receptacle on the machine. The welders simply plug in their machine and close the breaker. Each breaker and plug is color coded so the welder knows what line he is plugging into. Time saved will soon pay for the breakers and stations and the electrician has a better chance to service the plug equipment.

By T. D. Somerville,
Chief Electrician



Oh, I see



(upper:) Plant McManus near Brunswick, Georgia, went into service in November, 1952.

(lower:) Plant Hammond near Rome, Georgia, began service late in 1953.

Plant Yates at Whitesburg, Georgia, dedicated in October, 1952.

...they're using our valves at Georgia Power

Newest in their growing chain of giant power plants for expanding service in Georgia are these three plants. Indicative of their builders' desire to assure maximum dependability is their selection of OIC Valves for these plants.

Every OIC Valve is *precision-engineered* and *precision-made* to give longer, trouble-free service at no extra cost to you. OIC offers *precision-application help* in selecting valves best suited to each job.

THE OHIO INJECTOR COMPANY
Wadsworth, Ohio

VALVES | **FORGED & CAST STEEL, LUBRICATED PLUG, BRONZE & IRON**

Small Boiler Plant Maintenance Data (continued)

(Recommended inspection schedule starts on page 80)

ior. Clean trays and baffles. Examine floats and float mechanisms. Repair as necessary.

Open vent condenser and clean condenser tubes.

Remove bonnet of overflow trap. Repair or replace interior mechanism as necessary.

NO. 11—FLOW CONTROL VALVES

See Daily and Annual schedule for No. 2 above.

NO. 12—STEAM AND WATER CONTROL VALVES

See Daily and Annual Schedule for No. 9 above.

NO. 13—BOILER FEED PUMP TURBINE

Daily—Clean unit and check bearings and exposed moving parts for proper lubrication. Check bearing temperatures.

Check for unusual vibration or noisy operation.

Weekly—Trip emergency valve by hand trip lever.

Annually—Completely dismantle turbine and examine all mechanical parts including turbine blading, bearings, governing mechanism, and packing. Replace parts that are lose or mechanically unsound.

Re-assemble turbine and thoroughly check for proper mechanical operation.

NO. 14—BOILER FEED PUMPS

See Daily and Annual schedule for No. 13 above. Follow this schedule as applicable.

NO. 15—CHEMICAL PUMPS

Daily—Clean pumps and adjust feed setting in accordance with requirements dictated by tests of boiler water.

Check packing and adjust if necessary.

Annually—Dismantle pump and drive mechanism. Replace loose or worn parts and reassemble.

OTHER EQUIPMENT

MOTORS:

Daily—Check motors for overheating, lubrication, and unusual vibration.

Annually—Dismantle all motors and thoroughly clean. Repack bearings and paint windings with insulating varnish. (This is an absolute must.)

SWITCHES & STARTERS:

Quarterly—Examine all contacts and connections. Repair or replace if in any way electrically unsound or mechanically unsound. (This is an absolute must.)

STRAINERS:

For the first MONTH of operation remove and clean WEEKLY. For the following six months remove and clean MONTHLY. After that remove and clean SEMI-ANNUALLY or as experience indicates necessary.

VALVES:

Dismantle valve and renew valve parts or packing at first available opportunity when a leaking valve is noted.

Employee Attitude

The foregoing has briefly described a few of the mechanical aspects of maintenance. Perhaps more important is the attitude of the operator and the supervisor, or management as previously mentioned.

Whenever I see a fireman sitting on a patched up barrel reading a magazine in a perfectly good boiler plant that is dirty beyond belief and obviously poorly maintained, I think of a fireman that I saw years ago. I have a vivid picture of this fireman walking barefooted in long underwear through snow in the dead of winter, from the shack in which he changed his clothes, to the boiler room and then into the boilers to wash out the mud accumulated during the previous month's firing with make-up water from the river. This fireman knew very little, but he did know the danger of a blistered boiler when mud insulates the surface exposed to the fire. It presents an unfavorable comparison with some of today's firemen idling in front of automatic steam generators.

I am also reminded of an incident that clearly indicates the attitude of management, particularly in the small plant. It was a reciprocating engine driving a belted generator. The belt was 42" wide and on a Tuesday it was observed that the belt was worn beyond repair and about to break. Management said run the engine until the new belt could be fabricated and brought from a city some 200 miles distant. When the belt broke it wrapped around the 22 ft diameter fly-wheel and tore off the roof of the building. Before the fly-wheel settled in the pit the inboard and outboard bearing housings were shattered and the engine frame cracked. The factory was shut down for two weeks during the extensive repairs, and since the engine could never be really adequately repaired a new engine was eventually necessary.

Shop Coolant Pump

SINCE auto fuel pumps are comparatively cheap, they can be installed as coolant pumps on any moving machine, such as drill press, hacksaw, lathe or shaper, where work does not warrant the greater expense of a commercial coolant pumping system.

Such pumps can be located almost anywhere they can be reached with a lever or cam, an eccentric collar, a bump on a shaft . . . all can be used to operate the pump.

By L. H. Houck, Mo.

CHROMALOX

Electric Heaters

STRIP HEATERS

In straight lengths, formed or "finned" for conduction or convection heating. Industry's rugged and versatile heat source for many uses.

CARTRIDGE HEATERS

Installed in an instant in drilled holes for heating dies, platens, moving parts, rolls, molds, etc. Types available for immersion heating in liquids.

SHEATHED IN METAL FOR STRENGTH—INSULATED ELECTRICALLY FOR SAFETY

IMMERSION HEATERS

For heating water, oil and other liquids. Wide variety of types and sizes for portable or permanent installations, with or without built-in thermostats.

TUBULAR HEATERS

Straight lengths or tailored to any desired shape. For heating liquids, solids or gases by conduction, convection or radiation. Many sheath types.

Your LOW COST SOLUTION to processing heat problems!

Chromalox Electric Heaters give you quick, on-the-spot heat for a wide range of uses. They provide dependable, efficient, economical around-the-clock service in applications requiring continuous, accurately controlled temperatures. Thousands of plants in all industries have found Chromalox Heaters the low cost solution for heating liquids and gases; for heating dies, platens, moving parts; for superheating steam and pre-heating oil; in fact—for almost every industrial application using heat.

CHROMALOX

OFFERS YOU THE MOST IN ELECTRIC HEAT

Selection . . .

Over 15,000 types, sizes and ratings fill most applications needing heat up to 1100° F.

Engineering . . .

Research, development and technical personnel provide a vast reservoir of industrial heating know-how.

Experience . . .

World's largest manufacturer of electric heating units exclusively. 35 years of designing and manufacturing skills.

Service . . .

Over 130 field engineers in 36 key cities give on-the-job assistance and counsel.

EC-74

CHROMALOX

Electric Heat for Modern Industry

YOURS
without obligation

Catalog 50 is a storehouse of valuable information and data on many of the 15,000 Chromalox Electric Heating Units. Write today for your copy.

EDWIN L. WIEGAND COMPANY, 7563 THOMAS BOULEVARD, PITTSBURGH, 8, PA.

C. B. Rogers and Associates, 1000 Peachtree St., N. E., **Atlanta 5, Ga.**; L. R. Ward Co., 2009-11 Canton St., **Dallas 26, Texas**; 1814 Texas Avenue, **Houston 3, Texas**; 1519 South Boston Ave., **Tulsa 14, Okla.**; Ransom, Wallace & Co., 116½ East Fourth Street, **Charlotte 2, N. C.**

Obtaining Effective, Minimum Cost Maintenance in the 300 Worker Plant

By E. R. PROW,
Production Manager Knox Corporation, Thomson, Georgia

AT THE Knox Homes plant we have the same maintenance problem encountered by most plants in the 300 worker bracket—to get the most effective maintenance with the least possible amount of overhead cost. Obviously, the best maintenance department would be one which could handle any need, whether it be routine emergency, or modernization. Equally obvious is that in the average small plant, a maintenance department of the ideal nature would produce a prohibitive overhead load. At the other end of the scale is the possibility of having no maintenance crew and calling in outside help for all maintenance work. It is apparent that for many reasons this position is untenable. Therefore, somewhere in between these two limits is a reasonable compromise, a minimum cost-maximum efficiency point.

In our plant, and in most plants, we believe the following considerations to be the prime factors in organizing a maintenance crew:

1. Keep actual maintenance costs to a minimum.
2. Keep machinery down-time to a minimum in order to reduce overhead.
3. Prevent small malfunctions from mushrooming into major troubles.
4. Give careful routine service to equipment to prolong its life.
5. Keep the plant in good order.

Draw The Line

Each of these factors should be given its proper weight in analyzing the problem. Any overemphasis on one factor could lead to the neglect of another. For instance, overemphasis on cost could lead you to reduce maintenance to the point where the hidden costs, idle labor due to machine down-time, or excessive replacement costs, and the like, would exceed the savings effected by the reduction of direct maintenance cost.

The first step, then, is to draw the line between what should be done by plant maintenance and what should be done by outside help. No hard and fast rule can be established, but by analyzing your own past performance you will probably find, as we did, that there is a definite break point in frequency of maintenance calls, plotted against severity. There is also a definite break point in actual cost of maintenance, labor, tools, etc., plotted against severity. Although it is difficult to apply actual graphical analysis to the problem (one of the factors, severity, is intangible), these two break points may be roughly determined and then utilized in setting the limit on work done by the plant crew.

In the Knox Plant we have two entirely separate maintenance problems. One is the upkeep of the plant and its equipment, the other is the maintenance of our trucking fleet. As different as these two forms of maintenance are, our system applied equally well to both.

For the in-plant work our frequency analysis showed the majority of our work to be electrical in nature. Since we have some 800 hp demand with most of it in motors of 7 hp and less, it was no surprise that the majority of our work was electrical. Our cost analysis indicated that we could handle any of our electrical work that fell short of rewinding a motor, for a nominal investment in tools and qualified labor. Therefore, we decided that our crew would be primarily electrical in skill but with some mechanical ability present. We set the upper limits on knowledge as that necessary to cope with the maintenance we had defined as being within the scope of our own crew. Our final crew was as follows:

1. Foreman (2 years Technical school graduate)
2. Assistant foreman (with plumbing and steam experience)
3. Tool room keeper (with electrical experience)
4. Janitors.

The reason for putting the tool room keeper in the department was also electrical. We use a number of powered hand tools and the tool room man could use his spare time servicing these small pieces of equipment. The janitors were put under the jurisdiction of this department in order that the foreman would have a ready supply of labor for heavy work without having to go through channels to borrow some. We foresaw that we would have mechanical ability in the fleet maintenance so we ignored this aspect of plant maintenance entirely.

We then turned our attention to the fleet maintenance. The main units in our fleet are nine Mack diesels backed up with assorted sizes of gasoline powered trucks. We also have about 100 trailers, both single and tandem axle for the transport of our houses. When we applied our frequency and cost against severity method to the fleet our problem was readily solved.

The use of our method is more easily understood by following through this particular application. First of all, our objectives were as follows:

1. To keep the fleet on the road as much as possible, thereby reducing overhead.
2. To keep the tool investment and labor cost of maintenance at a minimum.

The tool and labor cost plotted against severity was found to take a large jump at the point of major overhaul. The frequency of mechanical failure against severity also indicated a definite break at the point of major overhaul. So our answer was defined. We would equip ourselves to do all the mechanical work short of a major overhaul; in other words, general

new catalog describes the
MOST ECONOMICAL HEATING SURFACE
ON THE **MODERN** BOILER

. . . that's the way to describe the Ljungstrom Air Preheater. For any boiler above 25,000 pounds per hour capacity – there's a Ljungstrom to cut your fuel costs . . . increase steam capacity . . . lower maintenance costs.

This new catalog includes detailed descriptions of the Ljungstrom Air Preheater, and illustrations showing how it is mounted on boilers of many different capacities. Included, too, are reasons why the Ljungstrom is so reliable . . . easy to maintain . . . resistant to corrosion.

FOR YOUR FREE COPY, WRITE TODAY TO THE AIR PREHEATER CORPORATION

The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.

parts changing such as rings, distributors, carburetors, wheel bearings, rear ends, etc. This setup is also able to handle the repairs on our mobile equipment in the plant, fork lifts, etc.

Our first thought was to combine the in-plant and fleet departments under one head in order to have all maintenance work well coordinated. However, here we ran into the overhead problem of having one more man on the payroll. So, we had the in-plant maintenance assigned to the plant superintendent and the fleet maintenance assigned to the transportation superintendent.

By establishing a very close liaison between the two maintenance sections, we were able to get effective, minimum cost maintenance for our Knox Homes plant.

Bearing Life Upped From Weeks to Months

THE Reynolds Metals Co. increased the life of bearings, used on its conveyor lines at Bauxite, Ark., five to eight times previous performance, by changing to sealed SKF bearings, and the removal of the grease fittings.

In 1950, Reynolds was changing the bearings on its carriers, conveying alumina, every few weeks. Alumina, a fine metallic powder, was entering unshielded bearings through grease holes. When grease was added, which was frequently, the alumina that had collected around the fittings was pumped into the bearings. The mixture acted as an abrasive, wearing both the bearings and their shafts.

Bearing life was upped from weeks to months, by the simple expedient of substituting SKF bearings, with double seals, and removal of the grease fittings. The holes left by the fittings were plugged, and grease packed around the outside of the bearings to trap any alumina that found a way into the bearing housings.

The "hot-flow-on" method strips paint by soaking it off. No brushing or scraping necessary. Oakite Stripper M-3 solution does the work in a fraction of the time required by manual methods. Note uniformly clean surface of stripped transformer at the right.

Hot-Flow-On Method For Stripping Paint

IT USED to take a Georgia maintenance and repair shop 72 man-hours to recondition transformers. Coils were removed and hand brushed with mineral spirits while the old paint was stripped from the interior of the transformer.

Then the company tried the "hot-flow-on" method. Making up a solution of Oakite Stripper M-3, at 8 ounces to the gallon of water, they pumped it through a shower-type spray head, over the interior of the transformer, with the coils still in place. They found that this setup completely removes grease, oil, and old paint with brushing—leaves the transformer ready for repair in just 4 hours.

They got a bonus, too. They discovered that they could reuse the stripping solution by catching it at the bottom of the transformer and pumping it back to the spray head.

Proper Tension For V-Belt Drives

THE B. F. Goodrich Company, Akron, O., has a simple rule-of-thumb guide for applying proper tension to V belt drives. Without correct tension, loose belts often slip and burn, turn over and destroy themselves. Loose belts also vibrate excessively on such applications as quarter-turn drives in rice fields, drives for recycling plants, pipeline station drives, slush pump drives and many other Southern and Southwestern applications.

First, determine the approximate center distance of the drive. (The free length of belting between driver and driven sheave contact amounts to practically the same figure.)

Second, sheave ratio does not enter into this picture. The results are the same for 1:1 ratio, 3:1 ratio, etc.

Third, for each 48" of center distance, normal pressure should be able to deflect a belt. (Apply thumb midway along the free strands of belting.) The deflection

"33,000 HOURS proved the choice was right!"

When a prominent North Carolina community converted its power plant to diesel operation, it called in Sinclair Lubrication Engineer Jim Holt for his recommendations on proper lubricants.

Mr. Holt reports, "I recommended Sinclair RUBILENE®. My previous experience convinced me that this diesel lubricating oil would provide maximum wear protection for this power plant's six 1000 K.W. diesel engines. RUBILENE also guards against sticking rings and prevents excessive wear of cylinders, pistons and other moving parts operating continuously for long periods.

"RUBILENE was the right choice," Mr. Holt continues. "After 33,000 hours of near-continuous operation, bearings show very little discernible wear – and there's not a sign of erosive or corrosive action. *Oil consumption is remarkably low*, considering the prolonged operating hours under overload. All six 1000 K.W. engines, with a total output of 6400 K.W. per hour, *use a total of only 1 barrel of oil a day!*"

Why not give a Sinclair Lubrication Engineer the chance to help solve *your* lubrication problem. *There's no obligation.* Contact your local Sinclair office or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N.Y.

SINCLAIR DIESEL LUBRICANTS

How Stetson saved 20% with *"that new snap-on pipe insulation"*

By using Gustin-Bacon's new "snap-on" pipe insulation of fine glass fibers, the John B. Stetson Company recently saved 20% on a pipe insulation job in its Philadelphia plant.

The major saving arose from the fact that one maintenance man did the entire installation, while other methods would have required two men. Because of the exceptionally light weight of Gustin-Bacon Ultrafine Pipe Insulation he was able to carry 6' sections of pipe insulation up the ladder easily. Then he simply spread the section apart at the seam, slipped it over the pipe—and it snapped into place. He secured the seam with staples and binder—no wire or covering was necessary. And lastly, he painted the insulation to improve appearance.

Stetson's cost-cutting experience is typical of that of other industrial leaders across the country. So if you have a pipe insulating job coming up, write today for information. We'll send you samples and complete information on the new pipe insulation that is thermally superior . . . lighter in weight . . . won't break or crumble . . . won't absorb moisture . . . can be easily cut with a knife . . . can be painted. Write *today!*

gb **GUSTIN-BACON MFG. CO.**

256 W. 10th St., KANSAS CITY, MO.

New York • Chicago • Philadelphia • San Francisco • Los Angeles
Houston • Tulsa • Dallas • Detroit • St. Louis

Plant Maintenance Aids

should be the thickness of the belt. This test assumes a double matched set of belts, with sheaves in alignment, with belts placed in the grooves without forcing, the slack in each belt traced around to the same side of the drive and that sufficient take-up is provided by motor, slide rails.

Fourth, it will be found that after the motor is bolted down or the slush pump or skid is anchored in position and the drive started, the belt—tensioned as above—will sag on the slack strands under full speed approximately one to one and one-half times the belt thickness.

The check of the operating tension is a safety factor because as long as this much sag on the slack is evident while operating, the belts are not too tight. By the same token, if operating belts sag more than the above, then there is a badly overloaded drive or the belts are not snug enough.

Fifth, when possible to do so and the changing of the center distance is not a major mechanical operation, it is advisable to again check this drive after some 24 to 48 hours of operation. This follow-up check determines whether the belt tension condition has changed. By far, the majority of the drives do not require an adjustment after this run-in period, but occasionally it is advisable to make a slight adjustment to maintain the No. 3 condition.

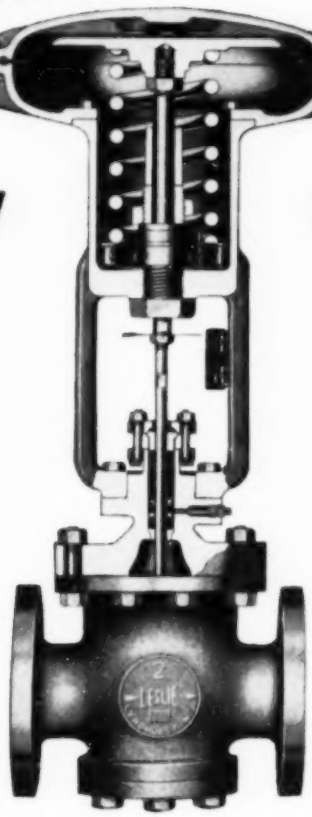
$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material — a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia

something **SPECIAL** in a **STANDARD** control valve...

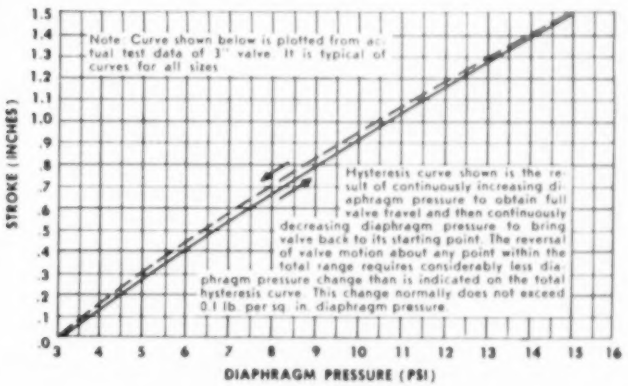


NEW SUPERSTRUCTURE

FOR LESLIE DIAPHRAGM CONTROL VALVES

Now standard for *all* Leslie Diaphragm Control Valves, this new rugged, precision stroke, superstructure means even more reliable performance than the high level set in the past by Leslie.

For instance, linearity (the straight line relationship between diaphragm pressure and inner valve movement) is held to plus or minus 2% for valve strokes up to 1½"—equivalent to .020" for valves with 1" stroke without using valve positioner. Hysteresis, the difference in position of the inner valve on the up and down strokes for the same diaphragm pressure, is held to 2% of full valve stroke for travel up to 1½". Here is the curve.


Note: Curve shown below is plotted from actual test data of 3" valve. It is typical of curves for all sizes
Hysteresis curve shown is the result of continuously increasing diaphragm pressure to obtain full valve travel and then continuously decreasing diaphragm pressure to bring valve back to its starting point. The reversal of valve motion about any point within the total range requires considerably less diaphragm pressure change than is indicated on the total hysteresis curve. This change normally does not exceed 0.1 lb. per sq. in. diaphragm pressure
STROKE (INCHES)
DIAPHRAGM PRESSURE (PSI)

Only Leslie gives you all of these "made-to-order" advantages in a standard valve.

- ✔ Full-flow, smoothly contoured body
- ✔ Renewable, interchangeable seat rings
- ✔ Bolted stuffing box
- ✔ Molded rings or Teflon packing
- ✔ Thermo-isolating bonnet
- ✔ Accurate part replacement from name plate data
- ✔ Stem flats for ease of connection

Send for
Bulletin 5304 (Single Seated Diaphragm Control Valves)
Bulletin 5305 (Double Seated Diaphragm Control Valves)

TRADE LESLIE MARK
REGULATORS SINCE 1900
STILL FAR AHEAD IN QUALITY AND PERFORMANCE

LESLIE CO., 261 Grant Avenue, Lyndhurst, New Jersey

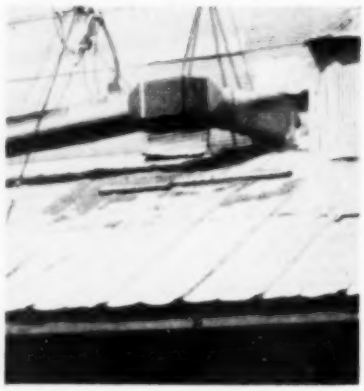
Plant maintenance ideas and methods (continued)

Rubber Faced Steel Stops Elbow Abrasion

AT THE Red Diamond Mills, Cordele, Georgia, the main unloading pipe wore out an elbow 3 to 4 times during harvest season. Grit and small rocks, about 8% of the average load of unshelled peanuts, quickly accomplished the destruction of this elbow.

New Design

A special elbow fabricated of Gates 60 durometer rubber faced steel plate was installed to combat this wear problem in the fall of 1949. Since that time, there has been no downtime necessary for elbow repair and the rubber faced



steel plate has outlasted the regular pipe elbow more than 9 to 1.

By Samuel S. Bundrick, Vice President, Red Diamond Mills, Inc., Cordele, Ga.

Oil Insulated Motor Starters

WE HAD several 2200 volt oil insulated type starters fail in our paper mill for one reason or another. As a preventive maintenance measure, we purchased an oil filter and established a record system for all oil starters and oil breakers. Oil is filtered at least once a year. The system has definitely paid off in decreased failures. It also facilitates contact inspection.

Plants without filters can purchase new oil, change it at regular intervals and send the contaminated oil to an electric repair shop that has filtration equipment. Some of the larger shops have trucks equipped with filters and test equipment.

By T. D. Somerville, Chief Electrician

STEAM TRAPS—How The Group Replacement Technique Saves You Money

QUALITY traps do not demand constant attention, but when they do need repairs, maintenance money can be saved by replacing parts not only in the trap requiring immediate attention, but also, in the remaining traps of that series.

For example, assume eight inverted bucket traps were installed on an eight-coil dryer at the time of its installation. When one of these traps becomes worn to the point of needing replacement parts, there is a direct savings if *all* the traps receive new internal mechanisms at the same time.

Several traps draining the same machine, receive approximately the same wear. When one trap becomes worn to the extent of needing new internal parts the others will be soon to follow.

If the remaining traps have an average of 10% service life before requiring repair, and the cost of a new valve, seat and lever assembly were approximately $4.00, replacement before absolutely necessary would involve a loss of $0.40 per trap. However, the labor cost involved will more than make up for this loss.

The left hand column of the comparative cost chart shows that the cost of labor involved to service one trap is $1.15. Therefore, repair labor for eight traps serviced individually would cost approximately $9.20.

The right hand column shows the cost of labor involved to service all eight traps at the same time. Here we find the labor cost is only $4.20. This leaves a labor profit of $5.00.

The loss of $0.40 per trap times the remaining seven traps is $2.80. Subtracting $2.80 from $5.00 leaves *a profit of $2.20 gained by servicing all eight traps at the same time.*

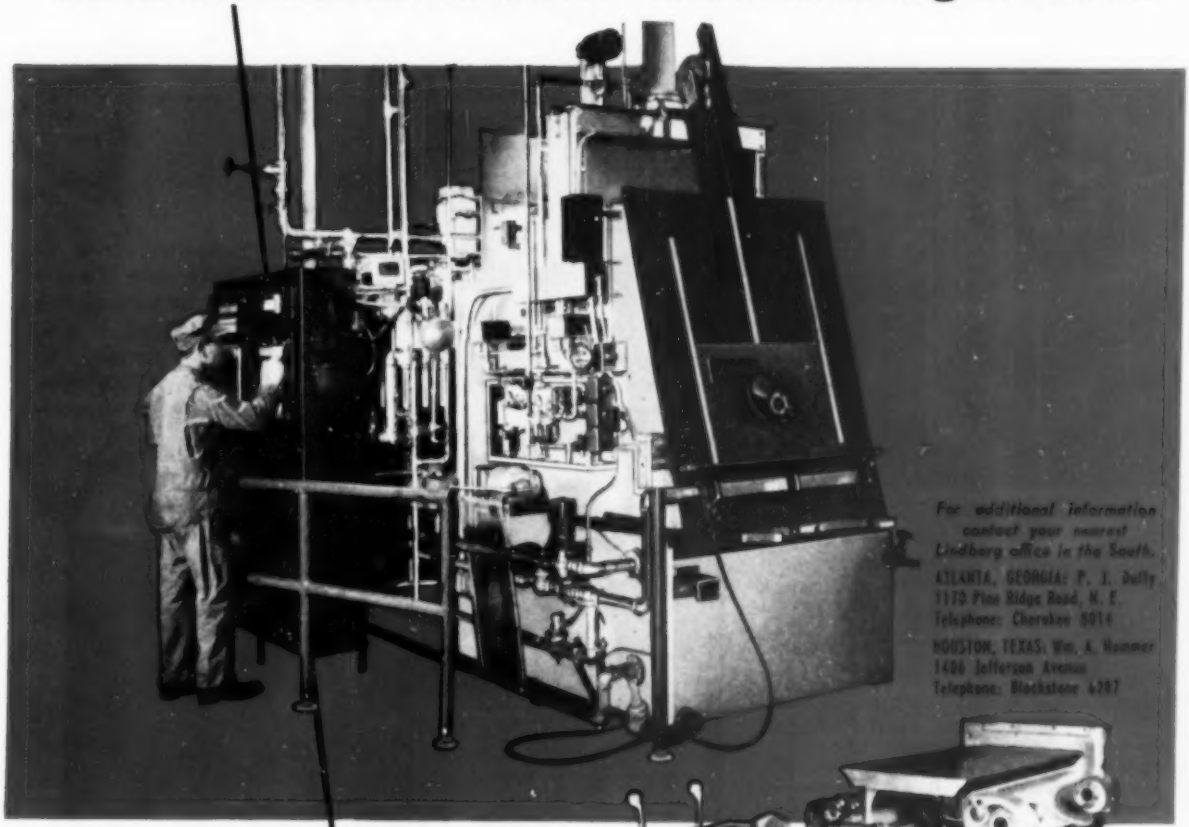
Thus, if traps are put on regular maintenance schedule and assembly-line servicing is employed, a very definite profit can be shown, plus the assurance of maximum operating economy at all times. Traps are sure to be kept in tip-top shape eliminating any steam or fuel waste that might occur if the trap is not caught before it goes bad.

Data courtesy Armstrong Machine Works

Comparative Cost Data on Steam Trap Maintenance

Labor Involved	Servicing One Trap Minutes	Cost	Servicing Eight at One Time Minutes	Cost
Get parts from store room	3		3	
Get tools	2		2	
From store room to trap	5		5	
Shut off steam	1		1	
Wait for trap to cool	5		5	
Remove cap and mechanism	2		16	
Replace valve seat and lever assembly	4.5		36	
Remove old gasket; clean gasket surface	2		16	
Apply gasket dope	1		8	
Put on new gasket	1		8	
Install cap with mechanism	2		16	
Turn on steam	1		1	
Back to shop	5		5	
(Labor Charge $2.00 per hour)	34.5 min	$1.15	2 hr; 6 min	$4.20
Total Labor Cost; Eight Traps	4 hr; 36 min	$9.20	2 hr; 6 min	$4.20

Kearney & Trecker Cuts Gear Carburizing Time 4½ Hours with *LINDBERG* Carbo-nitriding Furnace!



For additional information contact your nearest Lindberg office in the South.

ATLANTA, GEORGIA: P. J. Duffy
1170 Pine Ridge Road, N. E.
Telephone: Cherokee 5014

HOUSTON, TEXAS: Wm. A. Hammer
1406 Jefferson Avenue
Telephone: Blackstone 4787

Eight hours! That's how long it formerly took Kearney & Trecker's heat treating department to carburize a 300 pound charge of "secondary feed change cams and gears" to .030 case depth . . by pack carburizing and hardening in pit furnaces.

But now, with a new Lindberg Carbo-nitriding Furnace, K & T heat treaters handle the complete job in only 3½ hours . . a saving of 4½ hours over the old method!

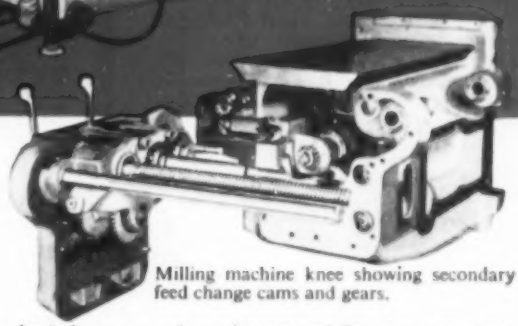
This "before and after" procedure list tells the story:

BEFORE . . . with old box furnace and pit hardening furnace.

1. **Pack parts in box**
2. **Load in carburizing furnace**
3. **Heat to specified temperature**
4. **Remove box from furnace . . . and cool**
5. **Remove cooled parts from box**
6. **Load parts on fixture**
7. **Lower fixture into pit hardening furnace**
8. **Heat to hardening temperature**
9. **Remove heated parts and fixture from work chamber**
10. **Quench in oil**
11. **Remove parts from fixture**

AFTER . . . with new Lindberg Carbo-nitriding Furnace

1. Place parts in open work basket
2. Load baskets and work into Lindberg Carbo-nitriding furnace.
3. The furnace then takes over, carburizing, hardening and quenching the load automatically without use of fixtures



Milling machine knee showing secondary feed change cams and gears.

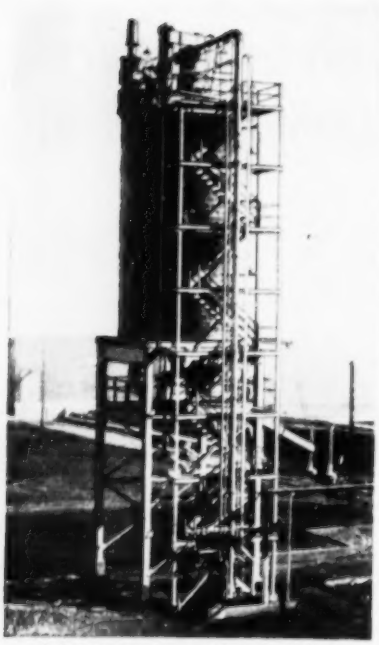
And there are other advantages! One operator was released for other important work. Greater uniformity was obtained. Core toughness improved because of the lower temperature used.

But the story doesn't end here. K & T uses this same furnace to carbo-nitride screws, nuts, T-bolts and washers (in 40% less time than with wet cyaniding) . . and also to handle the neutral hardening of studs (at pronounced labor savings).

And there are still other applications! . . carbon correction, and tool treating and annealing. The versatile Lindberg Carbo-nitriding furnace can do a job for you, too . . ask for details and descriptive bulletin No. 241.

LINDBERG FURNACES

Lindberg Engineering Company • 2486 West Hubbard Street • Chicago 12, Illinois



A National Installation at the CHEMSTRAND CORPORATION in Decatur, Alabama

turn the
EXPERIENCE
OF OTHERS
to your advantage

Many important engineers have learned that National Ash Conveyor Systems save money. A survey of your own plant will cost you nothing but it may result in cutting *your expenses* as it has *the plants listed.*

When you install a

NATIONAL PNEUMATIC STEAM ASH REMOVAL SYSTEM

you can count on long life with minimum down time for repairs. Rugged construction, careful engineering and expert National Servicing have made strong friends of our clients.

Representative NATIONAL INSTALLATIONS:

Central State Hospital • Cluett, Peabody & Co., Inc. • Fisher Body Division, G.M.C. • Memorial Hospital • National Distillers Chemical Corp. • Naval Industrial Reserve Shipyard

Send today for informative catalog illustrating typical applications.

NATIONAL CONVEYORS COMPANY, INC.
25 INDUSTRIAL AVENUE
FAIRVIEW, NEW JERSEY
Manufacturers of The National ChipVeyor System For Metal Turnings – Furnace Doors – Feeders – Ash Gates and Related Equipment.

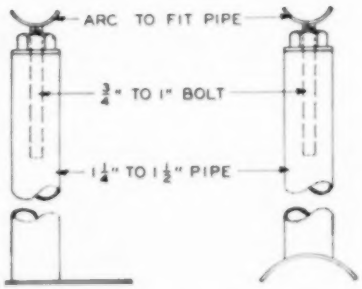
Plant maintenance ideas and methods (continued)

Versatile Pipe Jack

IN OUR refinery a simple pipe jack has proven very useful as a means of supporting pipe at motor valve or meter run settings and at pumps. The advantages of this support are that it is removable and adjustable yet also simple and economical to construct.

It has been used in two variations as illustrated. The construction shown at the left is used where pipe is to be supported from the ground. The base plate is mounted on a small concrete foundation block and is secured with anchor bolts.

The support shown at the right is used for supporting pipe which is directly above another line and



cannot be supported from the ground. The base plate is curved as shown to fit the pipe and the position of the support is maintained by the curvature of the two plates and the compression caused by the weight of the supported pipe.

By John F. Fuller, Ala.

Circle Guide for Cutting Torch

A SIMPLE circle cutting guide for a cutting torch is made by using a length of round rod with a nut welded on one end to fit the nozzle of the cutting torch. The nozzle just fits loosely into the hole. A sliding pivot on the rod serves to adjust the radius according to the circle to be cut.

In operation, the operator lays out his circle, makes a center punch indentation in the center and adjusts the sliding pivot so the nozzle in the nut will traverse the prescribed outline of the circle when the pivot point is held on the center mark.

With this simple outfit you can cut a circle much quicker than you can tell how it's done, and it is convenient to use. The torch is held with one hand and the point of the pivot is held in place with the other while the torch is moved around the circumference. The operator can stop and start at will without destroying the accuracy.

By L. H. Houck, Mo.

They're Harnessing Cyclones....

with REPUBLIC *Automatic* COMBUSTION CONTROL

● At a major chemical plant, the first 100% cyclone-fired industrial power plant in the country is being controlled for maximum combustion efficiency by Republic combustion controls. The plant produces 800,000 lbs. of steam per hr. at 1250 psi and 830° F. Steam is supplied to both chemical processes and to a 30,000 kw double-extraction turbine generator.

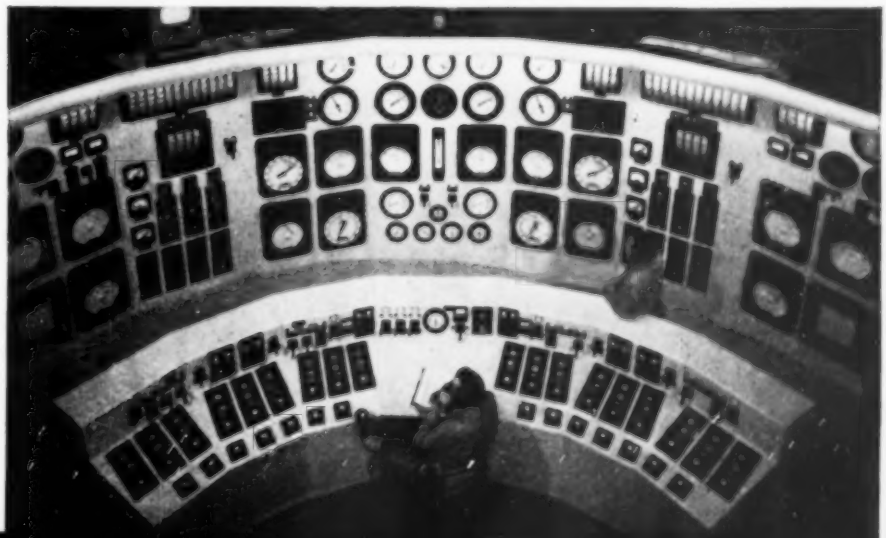
This cyclone-fired plant serves as *additional proof* that Republic combustion control systems can be adapted for *any* type of fuel firing.

There are Republic combustion control systems for all sizes and types of boilers, all arrangements of draft equipment and for all load conditions. There's an experienced engineering staff* to help you get the combustion control system that best fits *your* needs.

For full information, write for Data Book S-21 or contact your nearby Republic field engineer.

FOUR CYCLONES AT HIS FINGER-TIPS . . .

Two 400,000 lbs./hr. boilers fired by four cyclone furnaces are checked and controlled from this central control point. Republic sub-panels on the control bench board are provided for transferring between automatic and manual operation. Also included are Republic biasing sub-panels for adjusting coal-air ratio, primary-secondary air, cyclone ratio and boiler rating.



*For more than 37 years, Republic has specialized in the design and manufacture of combustion control systems for all sizes of power generating stations.

REPUBLIC FLOW METERS CO. ● 2240 DIVERSEY PARKWAY • CHICAGO 47, ILLINOIS

Broom Painting Method For Chain Link Fences

THE maintenance painting of industrial chain link fences is an annoying and messy item to contemplate but a very important factor toward securing the maximum return from the original investment and one that is all too often neglected.

The most established way of painting these fences is with an **ordinary paint brush** by hand. The shape of the brush is a matter of personal preference, with oval shaped brushes being preferred although flat brushes produce satisfactory results. The men usually work in pairs with one man covering each side of the fence, but at best it is a long tedious job.

Spray painting produces generally satisfactory results. However there are many factors involved which could be very time consuming and expensive. The foremost objection is the large amount of relatively expensive equipment required as a portable air compressor unit, the spray gun itself, paint pressure pot, hose, thinner for gun cleaning, etc. Also the greatest care must be exercised to protect the property such as electric insulators, buildings, automobiles, sidewalks and shrubbery.

Usually a 4 x 8 ft sheet of plywood is hung on the back of the fence with troughs and pans arranged on the bottom to catch the excess paint. The complete length of fence is first sprayed on one side, then the process is repeated on the opposite side. Generally one man operates the gun while a second man moves the backboard as progress is made. A third man to mix paint and assist in handling the equipment is recommended. After a day's work the equipment should be well cleaned and protected for the night.

A heavy **lamb's wool roller** similar to the type used for interior wall painting has some faithful followers. However, we believe this method has drawbacks, and that the cheapest, easiest and quickest method of painting link fence is with ordinary **floor brooms.** This can be a single man operation with the minimum of equipment although a two man crew usually proves to be best.

The only materials required other than the paint are a 12″ push broom with medium to soft bristles and a rectangular pan measuring approximately 15 x 24 x 6″ deep. Across the pan and about 6″ from one end a cross rod should be secured for wiping the excess paint from the broom.

TWO MEN using the broom method can cover from 200 to 400 ft of 6 ft high fencing per day, with one gallon covering approximately 30 ft. According to Subox, Inc., one coat of paint well applied should have a life of from three to five years, depending on exposure.

The operation is simple: The paint is thinned to a normal brushing consistency and is poured into the pan to a depth of about 2″. The broom is then dipped into the paint, the excess wiped off on the rod and the paint applied to the fence with a diagonal stroke. After the mesh has been covered on both sides in this manner, the handle can be unscrewed and the head of the broom used for painting the pipe supports with a conventional paint brush.

A stiff push broom, possibly with a wire bristled core, is recommended for removing the dirt and dust which is especially apparent on the lower portion of the fence. Weeds, vines and grass should also be completely removed. For the most economical maintenance program, the fence should be painted before becoming too rusty. If rust has taken its grip, a thorough wire brushing is required.

Paint Selection

The use of a paint containing a combination of lead-suboxide and flake aluminum pigments is desirable, as it has both the rust-inhibitive and anti-corrosive qualities of a primer along with the aluminum which restores the fence to its original appearance. Subalox #508 Gun Metal (a product of Subox, Inc.) closely matches the appearance of weathered galvanizing while the Subalox #510 White Metal is a lighter color and should be used where an older fence is to match a new installation. Both these paints have been used with great success in this method of fence painting and since they are a heavy-bodied material, flicking and splattering is kept to a minimum.

Care and Handling of Industrial Hose

PROPER care and handling of industrial hose can substantially lengthen its life and increase its efficiency.

Hoses vary greatly in many respects and for maximum performance, they should be as light, as flexible, and as easy to handle as pressure requirements will permit. Considerations to these details may demand a higher priced hose, but the greater safety and longer life afforded will result in ultimate maximum economy.

Assuming that the right hose has been chosen, *Quaker Rubber Corporation* offers the following list of DO's and DON'Ts for its maintenance.

DON'T store hoses near generators or electric motors. The smallest amount of free ozone has a definite oxidizing effect on all rubber compounds.

DO store hoses in a cool, dry area, coiled on a flat surface. The coil should be approximately twenty-five times the i.d. of the hose. Hoses

Regular CHIMNEY INSPECTION AND MAINTENANCE PAYS!

It will pay you to have your chimneys inspected at regular intervals by International's chimney maintenance engineers. These experts evaluate the effect of deterioration that, if neglected, may develop into costly major repairs. All maintenance work on any type of chimney is done quickly and economically without loss of production time to your plant operation.

Set-up an inspection and maintenance schedule with International now; you'll save money in the long run.

International Chimney Corporation also designs and constructs radial brick, reinforced concrete and self-supported steel chimneys for *Boiler Plant Operation — Incinerator Waste Disposal — High-Temperature Gas Diffusion — Low Temperature Acid Fume Dispersion — Alkaline Process Waste Gas Dissipation.*

Time and cost Estimates with no Obligation on your part.

Placing Steel Reinforcement around existing radial brick chimney of the Diamond Alkali Co.

INTERNATIONAL CHIMNEY CORPORATION

410 WICKWIRE BUILDING • BUFFALO, N. Y.

BRANCH OFFICES:

510 W. 5th St. Charlotte, N.C. • Roselawn Roger Bldg. Cincinnati, Ohio • M & M Bldg. Houston, Texas • 408 N. Midler St. Syracuse, N. Y. • Frederick Bldg. Cleveland, Ohio • 2801 Terramar St. Ft. Lauderdale, Fla. • Commercial Trust Bldg. Philadelphia, Pa.

with helix wire reinforcement, for example, gasoline and suction hose, should be laid straight.

DON'T hang hoses over sharp hooks. This will tend to deform the rubber permanently, causing cracks and weak spots when the hose is straightened out under pressure.

DO inspect the hoses regularly. Careful inspection, looking especially for abuses and excessive wear can prevent the most costly breakdowns—those which interrupt production.

DON'T shut the hose off at the nozzle. Bottling the elements being conveyed in the hose only retains high pressures and temperatures unnecessarily and leads to premature breakdowns of the hose.

DO turn the hose end for end, so that alternate positions will be exposed to destructive elements, e.g. in many cases, only a small section of the hose will be exposed to abuses. Service life may be lengthened by this alternating procedure.

DON'T drag or pull the hose over rough surfaces. Plan your operation so that a minimum of hose movement is required.

DO clean out sludge and dirt when you have finished using the hose.

DON'T subject the hose to more working pressure than it is built to withstand. This protection can avoid bursts which at times are responsible for serious accidents.

Connections & Couplings

In the care of hose, attention to the connection of lengths is an equally important feature. Hoses with fixed connections should be sufficiently long to provide a natural loop or free-hand between the connections. This lessens the possibility of the shank part of the coupling cutting through the tube into the carcass. It will also allow for natural hose contractions under pressure. For example, some moulded hose connections contract as much as 10% under pressure. On short hose sections with fixed connections, it is important that the hose connection be straight. A hose connection with a twisted or partially spiralled carcass will be subjected to destructive stresses.

Perhaps of greatest overall importance, is attention to the proper coupling and its installation. Regular check on fittings for tightness and excessive wear is essential. If hose ends become damaged by clamps at the fittings, the hose should be cut back and fittings reapplied where a new, sound connection can be made.

Maintenance Grinding

(*Starts on page* 82)

than that recommended by the manufacturer and which is indicated on the wheel blotter or tag. A wheel running overspeed may shatter as the centrifugal force builds up.

In operation, it is important not to jam work into the wheel. Be careful that work does not get wedged between the work rest and the wheel during off-hand grinding. Move the work rest in close to the wheel for safety and better grinding.

Always wear safety glasses or a protective shield when operating a grinding machine. (This is also good practice on practically all power driven machine tools.) Don't wear loose clothing or neckties which could be caught by the revolving wheel. An approved guard should always be used on a grinding wheel, including portable grinders.

Truing and Dressing

As in the case of any cutting tool, a grinding wheel must be kept sharp if it is to operate properly. Dressing is the term used to describe the method of "sharpening" a wheel. Dressing is done by removing the dull grains on the face of the wheel with an industrial diamond, a silicon carbide dressing stick, or a mechanical dresser consisting of hardened steel cutters which revolve against the wheel face, breaking out the worn grains.

Truing is similar to dressing except that the tool is used to form the face of the wheel, either perfectly straight, as form cylindrical grinding, or to a special contour as for form grinding. The truing tool may be used to alter the shape of the wheel from a straight wheel (Type 1) to a modified dish wheel similar to type 12, for example, if the dish wheel is not available.

How to Buy Wheels

Maintenance shops buy practically all their grinding wheels through distributors of mill supplies. Distributor salesmen are prepared to recommend grinding wheels for conventional applications and many are quite adept at solving some of the really difficult grinding problems.

Grinding wheel makers publish a variety of helpful booklets for users of abrasive products. If the local distributor cannot supply these, the manufacturer will be glad to send copies directly. Typical of these booklets is "The Handbook of Abrasives and Grinding Wheels" published by Norton Company. A folder entitled "One Can Handle Plenty" (form 107) provides a handy reference on selection of general purpose wheels. Most machine shops have a reference file of such literature.

Good grinding is largely a matter of experience together with a proper understanding of wheel selection. It is important to use the proper grinding wheel for the work to be done. By understanding the manner in which a wheel performs its work, it is possible to make one general purpose wheel do the work of several.

To insure good grinding in the maintenance shop, these steps are essential:

1. Get to know your distributor. Ask his advice on wheel selection. Show him what you are planning to grind so he can understand the problem.
2. Read the literature on grinding. Keep a reference file of this information.
3. Keep grinding wheels and machinery in good repair.
4. Follow safe practices.

If these four steps are followed, 90% of your grinding problems will be solved.

pd Stacks

for many of America's

most efficient

Power Plants

The wheels of industry move on *power*—generated by power plants that must produce economically, be trouble-free and operate for long periods with a minimum of maintenance.

Efficiency of the boiler is vital . . . stacks must insure this efficiency with a minimum of heat loss, must guarantee predetermined draft production, must assure correct static pressure at all times.

Stack efficiency often means boiler efficiency. That's why many of America's most efficient power plants are Prat-Daniel equipped.

These power plants specified P-D Stacks because:
1. Breeching, fan and stack are built as *one* unit.
2. Losses due to breeching bends are eliminated.
3. Predetermined draft production can be guaranteed.
4. P-D stacks are designed to fit specific power needs.

In the design illustrated, for example, two fans are utilized for widely fluctuating loads. Each fan handles approximately 70% of total volume. Second fan may be automatically cut in. The one stack may be used on two boilers.

Our project engineers—The Thermix Corporation—are experts in fan-stack and flyash collection applications. Consult them for the answer to your draft problems. Ask them for the Prat-Daniel Fan Stack Catalog.

Project Engineers

THE THERMIX CORPORATION

GREENWICH, CONN.

(Offices in 38 Principal Cities)

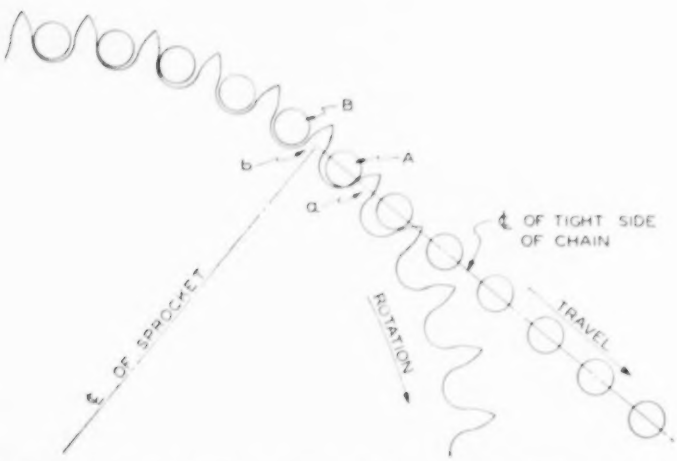
Canadian Affiliates: T. C. CHOWN, LTD., Montreal 25, Quebec, Toronto 5, Ontario

Designers and Manufacturers

PRAT-DANIEL CORPORATION

SOUTH NORWALK, CONN.

POWER DIVISION: Tubular Dust Collectors, Forced Draft Fans, Air Preheaters, Induced Draft Fans, Fan Stacks.



DIAGRAM, not to scale, shows position of rollers on either side of point where chain leaves sprocket.

Effect of Worn Roller Chains on Sprockets

IT HAS been my observation that many maintenance men, through lack of understanding, think that the useful life of a precision roller chain that has become loose from wear can be lengthened by tightening the chain. This is true only to a very limited extent and then only on sprockets having a relatively small number of teeth or pitches of the chain in contact with them.

A study of the action of a roller chain on a sprocket will show clearly why this is so: When the chain and the sprocket are both new the pitch of the chain and the pitch of the sprocket match perfectly and each link of the chain in contact with the sprocket will carry a portion of the total load. As soon as the chain begins to wear, the pitch of the chain begins to lengthen, and after very little wear the pitch will have lengthened enough so that only a few links on the tight side of the driven sprocket will be carrying the entire load. As the wear progresses fewer and fewer links are carrying the load. Finally, a condition develops where only one link is carrying the load which is passed from link to link as the chain leaves the driven sprocket. When the chain has become worn to this extent, wear on the sprocket will become severe, particularly if the chain is carrying an appreciable load or if the chain is run tight in this worn condition.

The diagram shows why severe wear is caused by the above condition. Since the pitch of the chain is greater than that of the sprocket, the roller "B" will not be bearing on the tooth "b" when the roller "A" is bearing on tooth "a", as a result roller "A" and tooth "a" will be carrying the entire load.

A study of the relative motion of the chain and sprocket will show that roller "B" will not begin to take any of the load until roller "A" has rolled well out on the point of tooth "a." The teeth of the sprocket are small in cross section near the point and are not designed to carry any load, so the point of tooth "a" will soon break off from strain or will be worn off from the continual rubbing action under heavy pressure.

As soon as the point of one tooth breaks off the condition becomes rapidly worse. The teeth immediately adjacent to the missing tooth will be subjected to even greater abuse, because the missing tooth is not carrying the load. The effect of a worn chain is much worse on a sprocket having a large number of teeth than it is on a sprocket having few teeth; it is also much more noticeable on precision roller chain than it is on other types of chain using blunt nosed cast tooth sprockets.

These conditions are usually encountered where chain is run without sufficient lubrication or where severe corrosion or abrasion is present.

With a new chain on the sprocket, the rollers of the chain would start to rise freely from the sprocket as soon as the center line of the chain passed the point at which it is tangent to the pitch circle of the sprocket, and there would be no rubbing or rolling action of the chain on the teeth.

The moral of this story is: replace the chain before it wears the teeth off the sprocket which may be expensive. If inexpensive it may be difficult to remove and replace. Even after the sprocket has been replaced the chain too must be replaced, if the new sprocket is to give any service. Keep roller chains well lubricated at all times.

By R. J. Worcester, Asst. Mgr., Morton Salt Company, Grand Saline, Texas.

Electrical Crews

MOST industrial plants can be laid out in departments for electrical maintenance work. The electrician is given a "territory" for daily maintenance and it is his responsibility to keep that territory in good operating condition.

In our paper mill, such departments have been the responsibility of the top-notch electricians; others being used for running conduit and plant changes. Good men take pride in their department and keep it in good operating condition. They plan their daily work with very little interference from our central electrical control point. They actually answer more to the production superintendent.

Additional help and engineering is available to them from the central control point. When central control sees a department going down they know who is responsible and can take action to prevent a breakdown.

By T. D. Somerville, Chief Electrician

PEERLESS PUMPS
FREE TECHNICAL PAPERS & ARTICLES
OF VALUE TO PUMP ENGINEERS & OPERATORS
technical papers
PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
LOS ANGELES • INDIANAPOLIS
WHAT IS NPSH
By: D. R. Rankin, Ch. Eng
A widely used term completely described
MECHANICAL SEALS FOR CENTRIFUGAL PUMPS
By: D. R. Rankin, Ch. Eng.
They're replacing packing
HORIZONTAL VS. VERTICAL PUMPS
By: Melvin Mann, Ch. Prop. Eng
An engineering analysis
CALCULATION & USE OF SYSTEM HEAD CURVES
By: Melvin Mann, Ch. Prop. Eng
For all types of layouts
PROPERLY PROPORTIONED SUMPS
By: R. H. Bird, Designer
Complete with diagrams

NEWLY PUBLISHED DATA BY PEERLESS PUMP ENGINEERS NOW AVAILABLE IN CONVENIENT FILE SIZE FORM

The technical papers titled and illustrated are republished articles, authored by Peerless Pump engineering personnel, which were printed in recent copies of leading trade journals. They contain a wealth of authentic, useful, practical, illustrative and descriptive information on pumps and allied subjects that you can use in buying or applying pumps. The five articles shown are available individually or together, bound into the file-size cover shown above. Use the coupon at the right to request the articles you want. They will be mailed free from Peerless Pumps—manufacturers of one of the broadest lines of horizontal and vertical pump lines for industrial and commercial application.

MAIL THIS COUPON FOR BULLETINS YOU WANT

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
301 West Avenue 26, Los Angeles 31, California

Please send reprints checked below:

☐ WHAT IS NPSH ☐ HORIZONTAL VS. VERTICAL PUMPS ☐ MECHANICAL SEALS
☐ SUMP DESIGNS ☐ SYSTEM HEAD CURVES

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

S. P. & I.

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION

Plants: Indianapolis, Indiana • Los Angeles, California
Offices: New York; Indianapolis; Chicago; St. Louis; Atlanta; Dallas, Plainview and Lubbock, Texas; Fresno; Los Angeles; Phoenix; Albuquerque

PEERLESS PUMPS

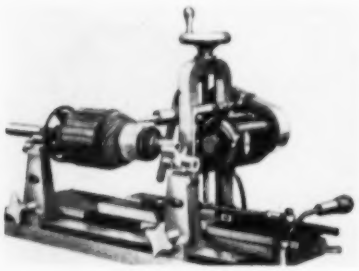
fmc

Equipment . . Supplies . . Methods

Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.

Bench Type Mica Undercutter

E-1 THE MARTINDALE ELECTRIC CO., Box 617 Edgewater Branch, Cleveland, Ohio, is offering the Model HV-3 Bench Type Undercutter which takes both horizontal and vertical commutators.



It handles a wide variety of armature sizes and shaft lengths and is designed for large volume production as well as service shop use. The carriage travels on ball bearings.

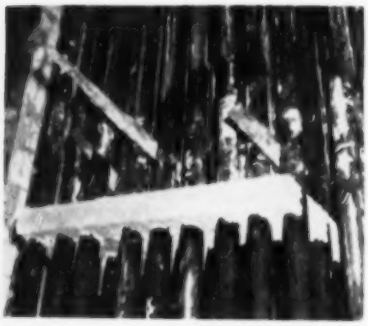
The new model undercuts horizontal commutators up to 6½" diam., 6½" long and vertical types up to 6" diam. It handles armatures 12" in diameter on V-supports, 10½" on centers.

The unit has 20" between centers. One center is spring-loaded but may be locked for heavy work. V-supports have 1" vertical adjustment.

Castable Refractories For Boiler Repairs

E-2 THE IRONTON FIRE BRICK CO., Ironton, Ohio, has developed five products for service at maximum temperatures of 1500, 2000, 2400, 2700, and 3000 F, to make castable refractories adaptable to the widest use, and to cut boiler repair cost as much as 50%.

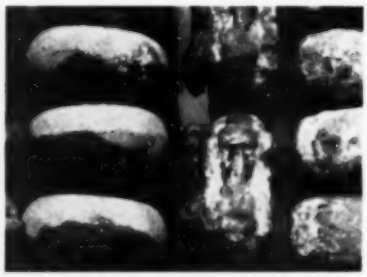
Castable refractories are successfully installed in water flushed ash pits, waste heat flues, gas tight baffles, furnace linings, boiler rear arches, boiler front walls, incinerators, and many other high temperature locations.



Baffle high up on the tubes in a new power boiler. Forms can be easily constructed. Refractory is poured and forms removed 24 hours later.

Cold Aluminizing Protects Heat Transfer Equipment

E-3 EMJAY MAINTENANCE ENGINEERS, Rutherford, N. J., have developed "Kolmetal," a new cold-metallizing coating, which is a mixture of 85% finely pulverized aluminum in a special plastic vehicle.



Two sets of acid cooling coils installed at the same time show how Kolmetal coated coils, left, were protected. Note corrosion on unprotected coils.

If water conditions are severe enough to require periodic cleaning, Kolmetal will result in substantial savings by reducing downtime and maintaining full operating efficiency.

According to the manufacturer, two or three coats of Kolmetal—depending on the surface, and yielding a minimum thickness of 7 mils—are recommended. They are applied by brush or spray, with a 4-hr drying time between coats.

The resultant coating when properly applied to clean and grease-free surfaces, can be polished, ground, drilled or bent to a 45° angle without chipping, peeling or cracking.

Tube Rolling Control

E-4 CRANE PACKING CO., 1800 Cuyler Ave., Chicago 13, Ill., has announced development of a new electro-pneumatic tube rolling control that combines the advantages of air operation with precision electric control.

Unit, capable of rolling ferrous tubes up to 2¼" I.D., is adaptable for use on condensers, heat exchangers, boilers, and evaporators.

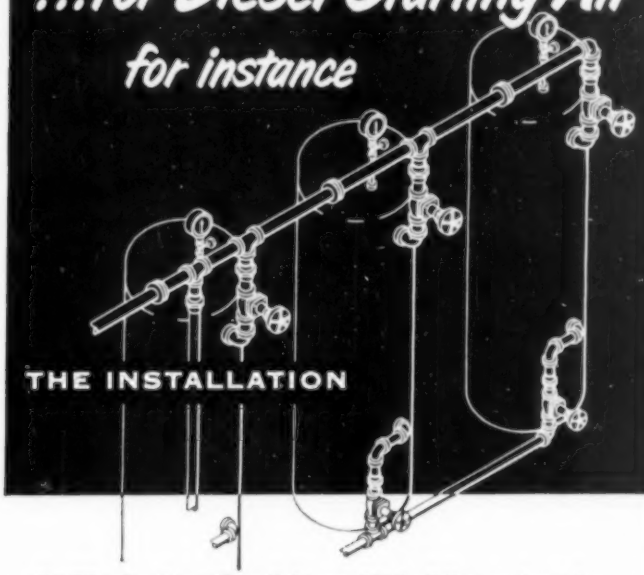
The new unit is equipped with an air motor which provides increased power and flexibility to give faster tube rolling and permit the use of only one motor for a wide range of tube sizes, both ferrous and nonferrous.

Pneumatic-electric control insures perfectly controlled amount of tube expansion into the sheet so that tightness and holding strength are held to the exact amount required for the service.

If It's a Hard-to-Hold Fluid, Here's Your Valve

...for Diesel Starting Air

for instance



THE INSTALLATION

By Higgins, Inc., New Orleans ship building and repair yard, famous for PT boats . . . now using Crane heavy-duty all-iron valves for 250 psi diesel starting air systems on passenger and truck ferries, fishing boats, etc.

VALVE SERVICE RATINGS

SUITABILITY:	100% Effective
FEATURES:	Lead faced disc
MAINTENANCE COST:	Rarely needs care
SERVICE LIFE:	Indefinite
OPERATING RESULT:	No loss of diesel starting air
AVAILABILITY:	Crane catalog item — No. 1504

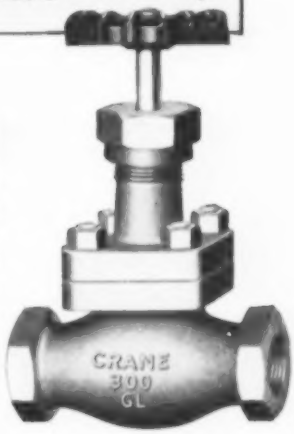
THE CASE HISTORY

By Higgins engineers' standards, marine diesel power is only as dependable as its starting equipment. Specifications are that a full charge be maintained in the starting air tanks overnight and longer. This, they found impossible with the conventional seating valves normally available for 250 psi working pressure.

But with Crane No. 1504 heavy-duty all-iron valves installed at the tanks, the problem was solved perfectly. These all-time favorites for dependable control of ammonia and other hard-to-hold fluids, are holding 250 psi starting air in the tanks indefinitely . . . and with valve dependability assured by Crane quality.

THE VALVE

Proved completely dependable in high-pressure ammonia, Crane No. 1504 all-iron globe valves are widely preferred for many air, oil, and gas services requiring the tightest seating, leak-proof body-bonnet joint, and extra-durable stem seal. Regularly supplied with lead face disc, or with steel seating for higher temperature and corrosive fluids. Sizes ¼ to 4 in.; flanged or screwed ends; also angle patterns. Ask your Crane Representative for Folder AD1977.

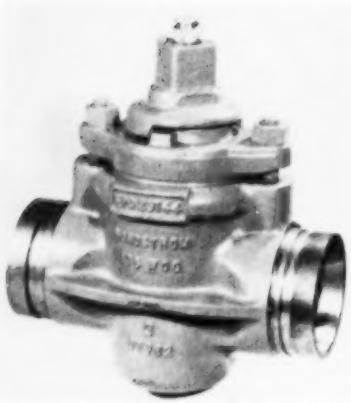


THE BETTER QUALITY... BIGGER VALUE LINE... IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING



Wrench-operated Nordstrom valve has pressure rating of 175 psi.

Grooved-End Semi-Steel Lubricated Plug Valve

E-5 ROCKWELL MANUFACTURING COMPANY, 400 N. Lexington Ave., Pittsburgh 8, Pa., has introduced a new grooved-end version of its standard two-bolt yoke type Nordstrom semi-steel lubricated plug valves, to make it possible to connect valves to steel pipe with grooved end couplings.

With this method, a tight, permanent connection can be made in a matter of minutes and lines may be dismantled as often as necessary without damage to the pipe or grooved end couplings.

Method also eliminates the need for level ditching because a deflection of several degrees at every joint allows the lines to follow the uneven contours of the ground. This flexible connection also offsets pipe vibration and overcomes the problem of pipe expansion and contraction.

For industry in general the valves are recommended for use in water and fuel lines, disposal lines, transportation lines, air and cooling lines and fire protection systems.

Industrial Paint Roller For Heavy Duty Painting

E-7 THE AMERICAN PRODUCTS CO., 3311 Edson Ave., New York 69, N. Y., announces the new Industrial Model Paint Roller Kit for heavy duty painting.

This Arsco set is widely used for maintenance work on wire fences, walls, floors, ceilings, iron work, etc.

The Arsco kit includes everything needed except the paint; a 9 in. industrial roller complete with Extend-A-Handle, one-piece steel tray, special paint mixing paddle and roller cleaning tool. Also packed into the kit is a sectional pole that is quickly assembled to form a 42 in. extension. This screws into the handle on the roller frame.

The rollers have extra deep pile natural lambskin coverings or an equally thick Dynel covering. The Dynel is recommended with water based paints.

Insulator for Hot Underground Pipes

E-6 AMERICAN GILSONITE COMPANY, 248 South Main St., Salt Lake City 1, Utah, has announced a new product for insulating and protecting hot underground pipes from corrosion.

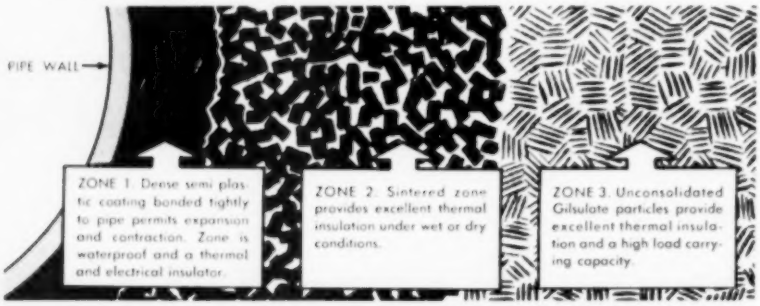
The insulation, known as Gilsulate, assures permanent protection against corrosion factors such as alkaline ground waters, electrolysis, root attacks, and bacterial action. It is a blend of specially sized and selected Gilsonite, a unique, solidified petroleum. When poured around a hot underground pipe, it melts and is fused to the pipe. Three layers are applied. The first two are completely waterproof, and the third provides excellent thermal insulation and a high load carrying capacity.

American Gilsonite Company's insulator is easy to install and does not require skilled labor. It is simply poured on, tamped down and backfilled. Gilsulate can be used for multiple pipe installation, even in cramped quarters.

This new material does not require sleeves or sheaths to protect the insulation; rocks need not be removed from the back-fill to avoid puncturing the insulation, and there is no need for expensive complex concrete ducts around the pipe. Where required, repairs or changes to the pipe line can be made quickly and easily by simply removing the back-fill and chipping off the Gilsulate structure.

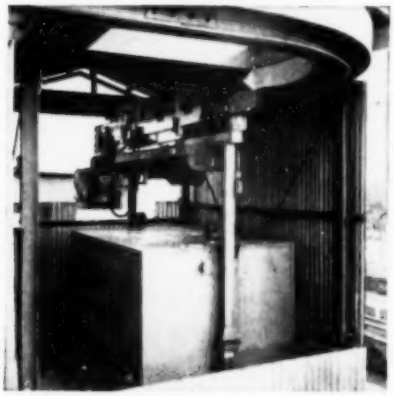
The new product is supplied in three grades to meet the needs of most hot underground lines, in temperature ranges of 220 to 310 F; 300 to 385 F; and 385 to 520 F, with different melting points at which the plastic zone is formed.

Structure is shown schematically. The three zones each contribute to the insulation and corrosion-protection of the pipe. Zones are formed from the loose insulation after it is poured around the pipe and heat is passed through the pipe.


PIPE WALL
ZONE 1. Dense semi plastic coating bonded tightly to pipe permits expansion and contraction. Zone is waterproof and a thermal and electrical insulator.
ZONE 2. Sintered zone provides excellent thermal insulation under wet or dry conditions.
ZONE 3. Unconsolidated Gilsulate particles provide excellent thermal insulation and a high load carrying capacity.

AUTOMATIC "UP AND OVER" TRANSFER

Three boxes—450 lbs. each—are loaded in car. When doors are closed the car raises to carrier.

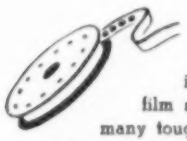


When car reaches upper limit, the Mono-Tractor propels carrier on the MonoRail to No. 2 mill.

SAVES $30,000 PER YEAR

Here is an "Up-and-Over"* system that eliminates 72 hours of handling labor per day. It automatically transfers 180 full bobbin boxes from three floors of one mill to one floor of another and returns the empties. Estimated savings in labor, trucks, floors and traffic congestion run upwards of $30,000 per year.

It is another of the many examples of American Mono-Rail engineering for low-cost handling within space limitation. Let one of our field representatives explain further the versatility and low maintenance of American Mono-Rail equipment.



***"UP-AND-OVER"**

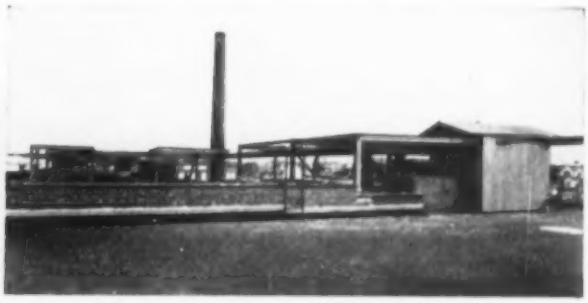
is the title of our 16-mm. sound film showing how MonoRail solves many tough handling problems. Please allow us three weeks to schedule showing.

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

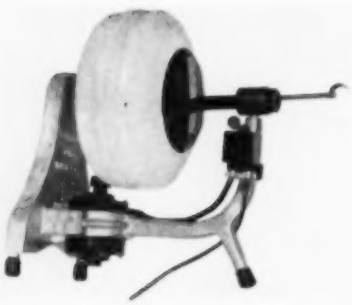
13105 ATHENS AVENUE • CLEVELAND 7, OHIO

Carrier travels at 50 f.p.m. around curves—150 f.p.m. on straight track with slow approach at towers.



At No. 2 mill car lowers to third floor for delivery of full boxes and return dispatch of empties.

Equipment . . Supplies . . Methods (Continued)



Portable Electric Sewer & Pipeline Cleaning Machine

E-8 GROVE MACHINE WORKS, P. O. Box 136, Bowling Green, Ohio, has introduced a small portable machine especially designed for cleaning of sewer and pipelines up to 4" in diameter.

Easy to use, it has twin expansion blades of high carbon steel, powered by a heavy-duty motor, which quickly remove scale, grease, rags, sand and other obstructions from the lines.

Known as the "Little Oscar," it has most of the features found in the larger model of similar design. It is a useful tool for any maintenance department.

Potentiometer Indicator

E-9 THE FOXBORO COMPANY, Foxboro, Mass., has introduced a new portable potentiometer indicator.

Designed for rugged industrial and field use, the instrument is completely enclosed in a metal case. Operating knobs and dials are protected by a removable cover, fitted with a clip to hold maintenance report blanks or data sheets. The instrument, with battery, weighs only 14 lb and can be operated in a vertical or horizontal position. An extra-long 17" scale permits close, accurate readings. Single or double-scale models will operate with test couples or existing couple installations.

Indicator will help maintenance men spot impending thermocouple failures and test operation of other pyrometric instruments.

Construction Adhesive

E-10 PIONEER LATEX AND CHEMICAL COMPANY, Lincoln Blvd., Middlesex, N. J., has introduced the Placco 1000 construction adhesive, formulated to produce

LOVEJOY
Power Transmission Equipment

Economical In Cost
•
Easily Installed
•
Efficient, Long Lasting

Send for catalog and engineering data

Flexible Couplings

Variable Speed Pulleys and Transmissions

Universal Joints

FLEXIBLE COUPLINGS:
No lubrication required. Provide positive protection against vibration, torque, shock of intermittent loads. Cushions changed without shutdown. Every duty from 1/6 to 2500 hp.

VARIABLE SPEED PULLEYS:
Quickly installed on new or old equipment. Change speed while machine is running. Ratios to 3 to 1. Fractional to 10 hp.

SELECT-O-SPEED TRANSMISSION:
Economical as compared to other variable speed transmissions. Instant adjustment over wide range of speeds. Hand wheel or lever control. Ratios to 10 to 1. Fractional to 5 hp.

UNIVERSAL JOINTS:
Precision ground. Finest alloy steel. No binding, backlash or end play. 13 sizes. Diameters 1/2 to 4 in. Bores 1/4 to 2 in. Lengths 2 to 10 5/8 in.

SOUTHERN DISTRIBUTORS:

Lewis Supply Co., 477 S. Main St., Memphis 2, Tenn.
J. K. Kessler & Assoc., 3313 W. Sevilla Cir., Tampa 9, Florida
Mr. George O. Mabry, 125 N. 41st St., Birmingham 1, Ala.
Mr. H. J. Baer, 304 E. Main St., Richmond, Virginia
Mr. Paul Simpson, Jr., 717 Byrd Park Ct., Richmond 20, Virginia
Woodward Wright Supply Co., 451 Howard Avenue, New Orleans, La.

LOVEJOY FLEXIBLE COUPLING COMPANY
4811 W. Lake St. • Chicago 44, Illinois

For more data circle item code number on the postage free post card—p. 17

a high strength bond between similar or different materials, such as glass, metal, porcelain, plastic, and other non-porous surfaces, to one another and to wood, rubber, masonry, etc.

Joints made with this new adhesive are flexible, waterproof, and heat resistant. In many cases the material will even replace screws, nails, and other fastenings. This chemically set adhesive when mixed becomes thoroughly stable and reaches maximum strength in 48 hours.

New Type Cement Mortar Corrosion Resistant

E-11 PENNSALT CHEMICALS, Corrosion Engineering Dept., 1000 Widener Bldg., Philadelphia, Pa., announces a new and exclusive all-purpose product under the trade name of "Pennsalt Furan Cement."

This new furfural-ketone resin development is highly resistant to acids, alkalines, and most solvents. It is available in two formulations. Powder S, a siliceous filler, is resistant to acids (except hydrofluoric), solvents, oils, grease, water, steam and mild alkalies. Powder C is a carbon type filler, an effective resistant for broad acid and alkali protection including hydrofluoric acid. Both powders are easily worked and may be handled safely.

Protective Garments for High Temperature Areas

E-12 FYREPEL PRODUCTS, INC., Newark, Ohio, are using non-combustible Fiberglas insulation and cloth in the newest type of lightweight garments to protect industrial workers who must operate in high temperature areas.

Garments made of coated or aluminized glass cloth with a Fiberglas insulation liner, include hoods, helmets, short and long coats, trousers, boots, aprons, and hand pads. For protection against radiant heat the company makes single-layer coats and trousers of aluminized flame-proof cotton duck or Fiberglas cloth.

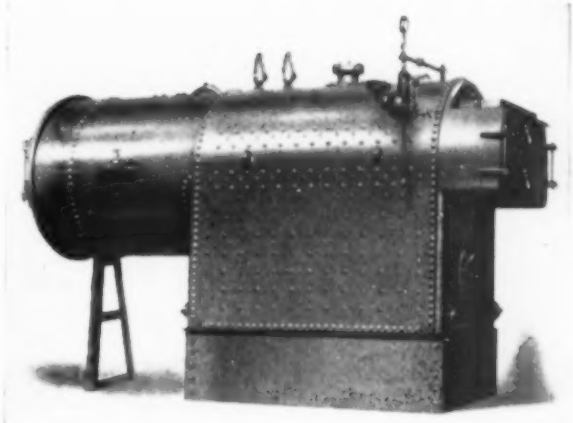
Compressed to an average thickness of ¾-in., the Fiberglas insulation has heat-stopping values five times greater than those of heavy single layer cloths. This affords added comfort and protection permitting the workman to be exposed to high temperatures for a longer time.

Steam Cleaning Material

E-13 OAKITE PRODUCTS, INC., 123A Rector St., New York 6, N. Y., manufacturers of industrial cleaning and allied materials, have announced the development of a new cleaning material, Oakite Composition No. 93, specifically designed for use in steam-generating equipment and in steam guns where the solution is siphoned from an auxiliary tank.

The product is a white, free-flowing powdered material which is completely soluble in water in a broad range of concentrations and use. It possesses exceptionally high sequestering ability and, when added to water up to 20 grains hardness, will show no precipitate or turbidity. Normal working concentrations range between ¼ and 4 ounces per gallon of water, into which the material is sprinkled and stirred until dissolved. Solutions are non-toxic.

POWER
with **POWER** *to spare*



A NEW DOUBLE PASS ALL-PURPOSE INDUSTRIAL AND HEATING BOILER

SOUTHERN MADE FOR SOUTHERN TRADE

Made in sizes from 44 H.P. to 153 H.P. S.B.I. rating with pressure to 150 lbs. Designed for coal, gas or oil firing, the New Lucey Double Pass Boiler can be furnished complete as a package unit.

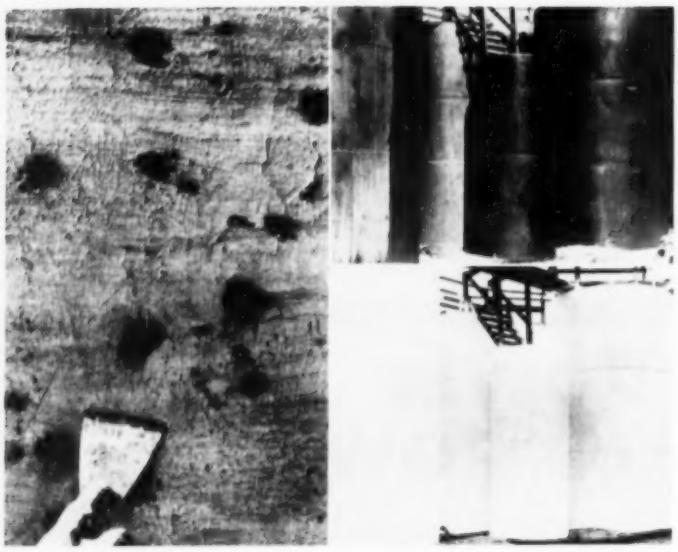
This boiler is in addition to our regular line of single pass fire box boilers which we have been making since 1918.

WRITE FOR BULLETIN NO. 153 FOR COMPLETE SPECIFICATIONS

LUCEY BOILER
AND MANUFACTURING CORPORATION

CHATTANOOGA, TENNESSEE
1814 CHESTNUT ST. CHATTANOOGA
1312 STERLING BLDG. HOUSTON, TEXAS

Equipment . . Supplies . . Methods (Continued)



These tanks are located in St. Louis, Mo. Loose rust and scale were first removed. After tanks were coated with Rusty Metal Primer (top right photo), two coats of an anti-corrosion coating based on Bakelite vinyl resins were applied (bottom right photo).

Metal Primer Formulated For Rusty Surfaces

E-14 SURFACE ENGINEERING COMPANY, INC., 1535 Barwise Ave., Wichita 1, Kansas, is formulating Rusty Metal Primer, which permits application of Bakelite vinyl resin-base protective topcoatings to industrial equipment without resorting to sandblasting or other means of surface preparation.

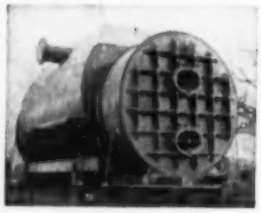
The new primer is intended only for rusty metal surfaces. It is especially useful where rust removal by sandblasting is impractical due to spark hazards, danger of contaminating nearby equipment, or the cost, time and small area involved.

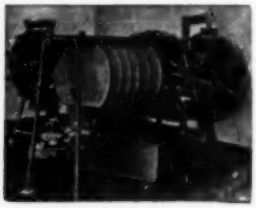
Thread Repair Kit

E-15 HELI-COIL CORPORATION, 1476 Shelter Rock Lane, Danbury, Conn., manufacturer of wire screw thread inserts, announces the availability of Thread Repair Kit No. 34CS.

Designed for use in maintenance departments of manufacturing firms, this repair kit contains an assortment of 25 inserts each of four commonly-

PERFORMANCE
IS BUILT INTO ALL
HEAT TRANSFER EQUIPMENT
by
CONSECO


CONDENSERS


REFINER FILTERS

Performance is the true yard stick for measuring cost. Ejectors — Condensers — Deaerators — Steam Air Jet Closed Heaters—Heater Units made by Condenser Service & Engineering Company perform not only as stated in contract, but for more than the contract calls. It is the extra trouble free service you want to consider when figuring the cost.

Send for full information, with illustrated literature. Tell Conseco Engineers your troubles and see how quickly they find the correct solutions. They are waiting to help you.

EVAPORATORS

STEAM JET AIR EJECTORS

CLOSED HEATERS

CONDENSER SERVICE & ENGINE CO.
154 Observer Highway, Hoboken, N. J.
HOboken 3-4425
N. Y. Tel.: BA 7-0600

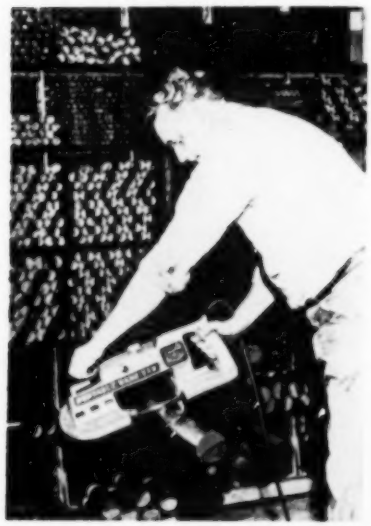
used sizes. All tools necessary for the wire insert method of thread repair—four taps, four inserting tools, and one insert extractor—are included in the kit. A printed direction sheet glued to the inside of the cover gives full instructions for installation of the inserts.

Portable Metal Band Saw

E-16 PORTER-CABLE MACHINE COMPANY, 33 Exchange St., Syracuse, N. Y., has introduced the new Model 524 Porta-Band Saw, which weighs only 16 lb, and is scarcely larger than a hand hack saw.

It is said to be the only metal-cutting saw ever made that is fast and light enough to be used free-hand in any position. The 524 with a stock-cutting capacity up to 3¼" by 4¼" is equal to a large hack saw. Equipped with a powerful motor, this compact machine eliminates fatigue, makes a cleaner, more accurate cut, and saves hours of time on jobs that formerly had to be done by hand. Even inexperienced workers can cut ferrous and non-ferrous metals, plastics and other problem materials with greater speed and accuracy.

Although movable motorized hack saws have been designed previously, their weight and bulk has made it necessary for them to be set on a bench or clamped to the object being cut. The light, balanced Porta-Band Saw can be operated easily in any position — overhead, vertically, or within a ¼" of flush with the floor.



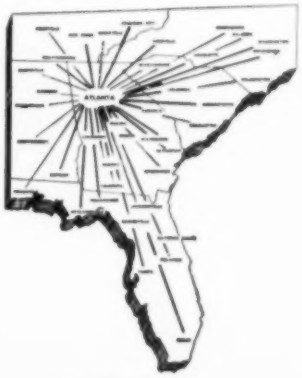
Bar stock is easily cut to size right in storage bins. Porta-Band Saw eliminates hard labor of cutting by hand, or transporting bulky material to stationary saw.

3 Steps to QUICK steel

1 CHECK YOUR NEEDS
2 CALL ATLANTIC STEEL
3 OPEN YOUR DOOR

STEEL WAREHOUSE SERVICE
You Can Always Count On

24 TO 48 HOUR DELIVERY
Throughout the South
BY TRAIN • BY TRUCK

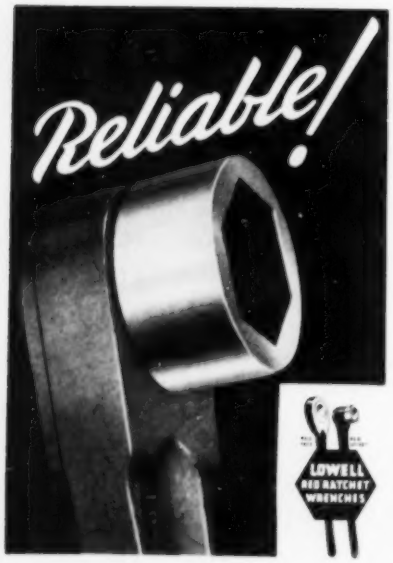


The minute your order is received, it is on its way to being filled and shipped. One of the South's largest and widest varieties of steel warehouse products, plus a willing organization coupled with the most modern facilities, makes this possible. So when you want steel, and need it in a hurry—

CALL ATLANTIC FOR STEEL

AMERICAN STEEL WAREHOUSE ASSOCIATION BETTER DISTRIBUTION

WAREHOUSE DIVISION
Atlantic Steel Company
575 14th STREET, N.W. ATLANTA 1, GEORGIA • EMerson-3451



LOWELL
SOCKET
WRENCH

REVERSIBLE RATCHET

Easier, Safer, Faster to Use!

1. **Snap Ring**
holds socket more securely. Removed easily with narrow screw driver or any pointed object.

2. **All Steel Cap**
instead of cast. Collar press fitted and swaged to form one-piece integral unit with larger all steel bearing for much longer wear. Cap locked into head by internal projection and screw. (Even with screw lost and cap swung 90° parts cannot fall out.)

3. **High Tensile Alloy Handle**

4. **New Tough Synthetic Finish**

5. **Enlarged Hole for Lanyard**

L-1

Order from your Distributor. Ask him for our Catalog 460A which shows the full line.

Lowell
WRENCH CO.
WORCESTER, MASS.

Equipment . . Supplies . . Methods (Continued)

Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.

Folding Trucks

E-17 FEDERAL CASH REGISTER Co., P. O. Box 2265-H, Kansas City, Mo., has recently developed several models of folding trucks which are ideally suited for use by maintenance workers in industrial plants, as well as for many other applications.

These trucks are offered in three sizes: the "Regular" for loads of from 25 to 300 lb; the "Heavy-Duty" for loads up to 500 lb; and the "Self Balanced—2 Wheeler," which can be handled by one man. The trucks afford substantial savings in man-hours, because they are suitable for many applications that would ordinarily require the labor of two men. All models are available with 2-way outlet and a 10 ft extension cord for light and power, at slight additional cost.

Energizer Measures Voltage & Current at Line Outlet

E-18 PYRAMID INSTRUMENT CORP., Lynbrook, N. Y., has introduced the new Amprobe Energizer Model A-40, an accessory which makes possible instant current and voltage readings at the wall outlet, when used in conjunction with a snap-around volt-ammeter.

One innovation is the providing of receptacles for measuring line voltage

Checking current at receptacle with aid of Amprobe Energizer. Energizer is priced at $3.75; Amprobe, Jr., snap-around voltmeter is $19.85.

at the outlet—under actual load conditions, while the appliance is connected to the line. Another new feature is the heavy duty construction which increases the capacity to 25 amp for direct readings, and 10 amp for 10x sensitivity readings.

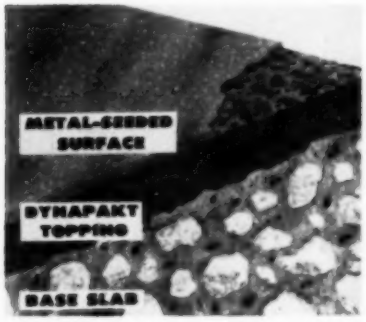
One-Man Power Threader

E-19 THE OSTER MANUFACTURING COMPANY, 2057 East 61st St., Cleveland, Ohio, has introduced a completely new, low-cost power drive for hand pipe tools, the No. 142 "Featherweight Champ."

Weight is only 75 lb. One man can move it and use it with ease. Available with either gas or electric power, the machine has a threading range of ⅛" to 2".

Metal Aggregate for Concrete Floor Surfaces

E-20 FLASH-STONE COMPANY, 3723 Pulaski Ave., Philadelphia 44, Pa., has introduced a new industrial flooring process named Metal-Seeded Dynapakt, which is said to add the strength of iron to heavily-traveled concrete floors.



With the process, Flash-Stone installs an eighth-inch "veneer" of iron-chip aggregate as a non-spalling, non-crumbling, non-slip armor over fresh concrete topping. The entire flooring operation is performed with special heavy-duty power equipment to insure maximum compaction and adhesion of concrete and metal.

Fish Oil Base Rust Preventive

E-21 RUST-SELE COMPANY, 9808 Meech Ave., Cleveland 5, Ohio, is producing an improved fish oil base line of rust arresting metal coatings that may be applied directly to rusted surfaces with a minimum of preparation.

Use of "Rust-Sele" requires only that the surface to be coated be wire-brushed to remove loose rust, paint scale and dust.

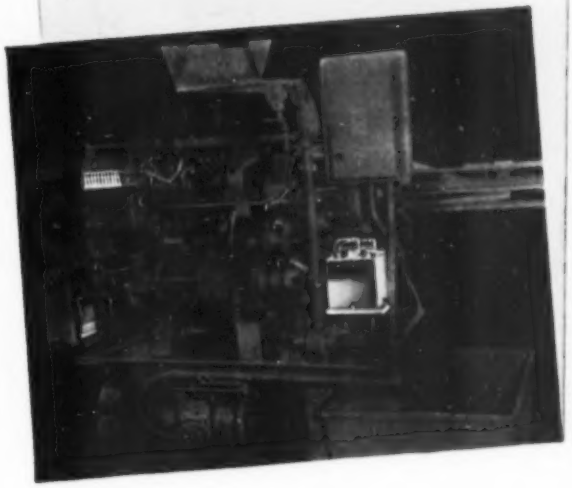
Its ability to form a tough, elastic, weather-resisting coating is said to make it ideal for original coatings in addition to maintenance service on machinery exposed to severe weathering conditions.

Because of its ability to penetrate rusted surfaces, the product is said to save maintenance time usually required to remove rust and to clean the surface for ordinary painting procedures.

Rust-Sele has been developed in two basic types: "long-oil" coatings for exterior (one application) service, and "short-oil" for interior use. Both coating types are available in 24 colors, including white, aluminum, and black. The line is developed to withstand temperatures up to 450 F.

PULSOLATOR

The Automatic Lubricator that can be 400 places at once as often as 20 times a minute



Yes, Pulsolator can dependably lubricate as many as 400 bearings with a controlled quantity of oil, as frequently as 20 times a minute, through a single system with loop line up to 300 feet.

Here is your answer to reliable, automatic lubrication for machine tools, printing presses and similar equipment where the higher pressures of force feed systems are not essential. Pulsolator can save you money by eliminating oil waste and repairs and down time that come from lubrication failures resulting from human oversight or neglect.

Systems with various capacities and with both gravity and pressure feeds are adaptable to an endless variety of applications. Let experienced Manzel engineers show you how Pulsolator automatic lubrication can lower your costs and speed production efficiency. Write:

Manzel

DIVISION OF FRONTIER INDUSTRIES, INC.
918 BABCOCK STREET BUFFALO 10, N. Y.

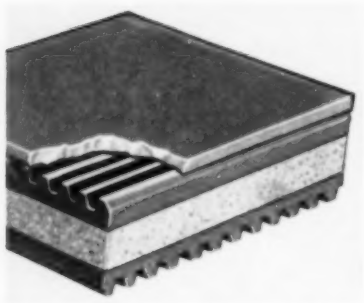
Equipment . . Supplies . . Methods (Continued)

Pad-Type Damper Eliminates Bolting

E-22 THE KORFUND COMPANY, INC., 48-48 32nd Place, Long Island City, N. Y., is offering the new VPS Elasto-Rib Damper, a highly effective, inexpensive vibration isolating material, to allow quick re-arrangement of production lines for new setups without the usual "downtime."

This easy to install pad-type damper adds great mobility to heavy equipment by eliminating expensive bolting to floors, yet prevents machine "walking." Typical applications include machine tools, punch presses, air conditioning equipment, engines and printing presses.

Elastic-Rib utilizes the elastic and damping properties of both cork and rubber, combined to handle like a single material, providing better performance than either alone because vibration and noise are impeded at boundaries between materials of different densities. It has a core of high grade cork plate permanently bonded between two layers of oil resistant Neoprene rubber deeply grooved to increase deflection of the cushion over a wide range of loadings, and to form a non-skid surface which resists shifting or creeping of the machine.



Vibration damper does not pack down, and can be used over and over in new locations.

Thread Sealing Compound Has Chemical Resistance

E-23 FLEXROCK COMPANY, Packing Division, 3645 Filbert St., Philadelphia 1, Pa., has developed a thread sealing compound, designated "Flexrock 25, Teflon Pipe Dope."

It is recommended for use on chrome, chrome plate, nickel, steel, ceramic and plastic pipe threads and for joining or connecting dissimilar materials. The excellent lubricating qualities of Flexrock 25 prevent galled threads and permit easier pipe joining, that can be readily dismantled even after long periods of exposure to the most rigorous conditions. Tests made by the Flexrock Laboratory on lines conveying strong acids, alkalies, and solvents, at temperatures —150F to 500 F, indicate good sealing is achieved without application of maximum torque.

Portable Filter

E-24 CUNO ENGINEERING CORP., Meriden, Conn., is marketing a portable filter completely equipped with pump, motor, oil resistant hose, gauges and filter for use with such fluids as lube and hydraulic oils, coolants and a wide range of heavy and thin industrial fluids.

The standard design is equipped with a ½ hp motor and a gear pump with a capacity of 4 gpm. The filter guarantees removal of all particles down to 25 microns in size. Other features for special designs are centrifugal pumps, higher capacities, and degrees of filtration of 10 and 59 microns.

Southern Representative: JOHN D. HOMAN, 14 So. Orleans Ave., Tampa, Florida

Boiler Cleaning

(*Starts on page* 92)

ing companies, boiler manufacturers and makers of soot blowers who have encountered similar problems. Soot blower manufacturers in particular maintain sales, service and engineering staffs whose business it is to solve boiler cleaning problems. Their recommendations cost nothing. Their assistance can be invaluable.

Fork-Lift Trucks Handle Many Jobs

(*Starts on page* 98)

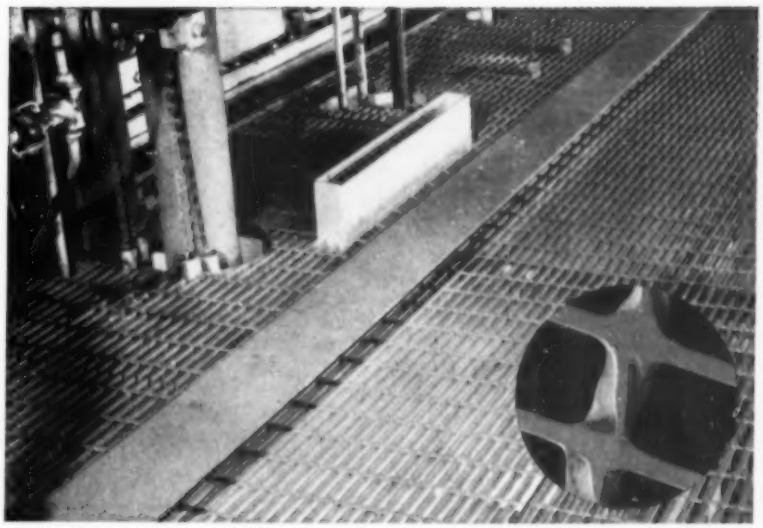
and standard electric light bulbs as well as for general maintenance of the lighting fixtures. Painting of overhead girders, and ceilings was indicated as an important field of use for material handling equipment.

Equipment Necessary

Should the maintenance department have material handling equipment assigned to it for its own specific use? The answers to this question varied according to the size of the plant reporting. However, it was felt that the maintenance department should have certain types of equipment assigned to it as a minimum requirement.

Chain and electric hoists equipped for extra long lifts were considered essential. Two- and four-wheeled hand trucks were also considered a "must." Special consideration should be given to the use of light-weight metals for equipment assigned to maintenance work.

The question of powered equipment such as fork-lift trucks and industrial tractors depends on the size of the plant and the volume and type of maintenance work. Some of the larger plants, a pool of powered equipment of various types is maintained to take care of all requirements, production as well as maintenance. In such cases, the maintenance department



Grating by BLAW-KNOX

what can steel grating do for you?

You naturally think of steel grating for floors, platforms, walkways, catwalks and stair treads.

But have you ever thought of how steel grating can make your danger spots safe . . . by covering an unprotected open pit or light well, by guarding a fan, by providing some sturdy shelving, or by serving some purpose you'd never thought of before. Look around your plant, both inside and outside, to see where you can use versatile steel grating . . . to make your plant an even better, safer place to work.

If you come across some tough problem on a grating application, we'll be glad to offer our suggestions.

Only Blaw-Knox Electroforged® Steel Grating and Stair Treads —have these five exclusive features:

1. rigid one-piece construction—easy to install
2. all surfaces accessible—easy to paint
3. no sharp corners to clog—self-cleaning
4. maximum open area—for light and ventilation
5. non-slip twisted crossbar—safe footing

A short note will bring you a copy of new Bulletin No. 2365-R a dimensional sketch will bring you a quotation.

BLAW-KNOX

BLAW-KNOX COMPANY
2034 Farmers Bank Building • Pittsburgh 22, Pa

BLAW-KNOX EQUIPMENT DIVISION GRATING DEPARTMENT

GRATING APPLICATIONS: floors • platforms • walkways • catwalks • stair treads • fan guards • shelving • and many other uses, both outdoors and indoors, for versatile steel grating

obtains powered equipment from the pool.

In some of the small plants, the heavier powered equipment is borrowed from production departments for use during off-hours. For short range non-repetitive jobs material handling equipment is leased or rented. In some cases, special maintenance jobs are done by contractors who generally bring in their own equipment.

In some of the larger plants covering a big area, speed of getting personnel and equipment to the site of a breakdown is a problem because of the distances sometimes encountered. In plants of this type, powered equipment instead of hand-operated trucks were considered warranted to carry personnel, repair parts and tools from the maintenance shop to the trouble spot.

Some of the members polled underscored the value of powered equipment for making emergency repairs and were of the opinion that maintenance crews should have power equipment available at all times to enable them to reach distant parts of the plant without delay where work of an emergency nature is required.

Once the maintenance department has used material handling equipment for one specific job, it was discovered that material handling equipment would save time on many other types of jobs.

Answers to the question, "Of the total time devoted to maintenance, in what per cent is material handling equipment used?", varied widely. While most of the replies fell between 15 and 50%, some went close to 100% and some indicated this figure as "negligible." In many plants this figure is difficult to obtain because material handling costs in maintenance are not segregated.

Plant Engineering Job

Regarding executive or supervisory personnel involved in material handling and maintenance, it was found that, in many plants, both functions are handled by one individual who has the title of Plant Engineer. In two plants, the General Foreman of the warehouse and stockroom has responsibility for material handling, and maintenance is under the direction of another executive.

In the larger plants, the responsibility for material handling and maintenance is specifically divided. Material handling in production is the responsibility of the Production Manager and material handling in maintenance comes under the Plant Maintenance Engineer.

The survey brings home again the fact that the title "Material Handling Engineer or Manager or Supervisor" is still a rarity. As a general rule, the Plant Engineer is the man responsible for material handling as well as for maintenance.

The poll conclusively shows that there is a field of usefulness in maintenance work for material handling equipment of several types. As material handling equipment is more widely used in a given plant, the greater its application to maintenance work will be.

EXTRA YEARS

OF MORE DEPENDABLE POWER
and at less cost per pound of steam

TODD BURNERS

GAS OR OIL

COMBUSTION EQUIPMENT DIVISION
TODD SHIPYARDS CORPORATION
81-16 45th Avenue Elmhurst, Queens, N. Y.

TODD NEW YORK U.S.A.

Plant Maintenance Aids

Leading manufacturers have made available on-the-job maintenance aids—valuable catalogs, bulletins, check-charts, etc.

Unit heater maintenance . . . adhesives . . . pipe insulation . . . how to stop condensate corrosion . . . vibration control . . . maintenance paints . . . pulley lagging method . . . and tips on selecting scaffolds will be of special interest to plant maintenance men.

These on-the-job aids are available for the asking without cost or obligation. For details check page 158.

News (continued)

(*Starts on page* 12)

American Flexible Coupling Names Slaughter—Tenn.

HUNLEY A. SLAUGHTER of CRAIG SALES & ENGINEERING CO., 1101 Poplar Avenue, Memphis 5, Tennessee, has been appointed District Manager in TENNESSEE and ARKANSAS by the AMERICAN FLEXIBLE COUPLING COMPANY, Erie, Pa., manufacturers of flexible couplings for power transmission.

Hyster Names Rector, S.E.

HYSTER COMPANY, 2902 N. E. Clackamas St., Portland, Oregon, has announced the appointment of JAMES N. RECTOR as district manager of the southeast territory, with headquarters in ATLANTA, GEORGIA.

James N. Rector

Hyster Company manufactures a complete line of industrial materials handling equipment and logging and tractor tools.

Chrysler Airtemp — Southern Sales Div.

S. A. ANDERSON, JR., has been named assistant sales manager of CHRYSLER CORPORATION'S AIRTEMP DIVISION, in charge of the newly formed Southern Sales Division, which includes the DALLAS, NEW ORLEANS, ATLANTA and MIAMI sales regions. Mr. Anderson will be located at the Airtemp headquarters in Dayton, Ohio.

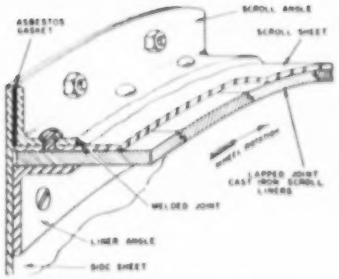
Anderson joined Chrysler Airtemp in 1943 as field engineer in the WASHINGTON, D. C., sales region. He subsequently served as Washington regional manager and as eastern sales manager. Since 1948 he has been manager of Airtemp's ATLANTA regional sales office.

W. E. EDWARDS, a native of Georgia, who has previously been a field engineer for Airtemp, succeeds Mr. Anderson as manager in Atlanta.

How a FAN HOUSING Helps Produce CHEAPER POWER

Here's a part of your power-producing equipment to watch, because it has so much to do with keeping your maintenance costs down and cutting draft timeouts to a minimum.

When you specify a "Buffalo" Induced Draft Fan, you get as rigid and heavy a housing as modern engineering can produce and still give you a highly efficient fan. You get a scroll shape that minimizes the powerful erosive action of hot fly-ash — with steel scroll liners to further delay erosion. These are easily replaced from inside or outside. All these "Buffalo" features combine to give these fans an extra margin of long life — in a "hot spot" where long fan life means big savings. And — many years later — when erosion finally necessitates repairs — "Buffalo" bolted sectional housing construction provides accessibility that shortens and simplifies the work.



Showing detail of "Buffalo" Removable Scroll Liner.

Naturally, all other parts of "Buffalo" Draft Fans are built of equally durable construction — rotors, shafts, bearings and inlet boxes. And the number of "Buffalo" Fans still carrying on after more than a quarter of a century, is proof of this endurance which means economy. Why not check "Buffalo" engineering by writing today for Bulletin 375?

BUFFALO FORGE COMPANY

530 BROADWAY BUFFALO 4, NEW YORK

Publishers of "Fan Engineering" Handbook

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

"Buffalo"

PRESSURE BLOWING COOLING HEATING FORCED DRAFT
VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING

News for the South and Southwest (continued)

Timken Names Preston—Texas

The TIMKEN ROLLER BEARING COMPANY announces that RALPH W. PRESTON has been appointed Sales Engineer with headquarters at 2626 Westheimer Road, HOUSTON, TEXAS. Recently Preston has been engaged in metallurgical investigation for the Timken Steel and Tube Division. He is a graduate of the University of Kentucky.

Morse Chain—Midwest

MORSE CHAIN COMPANY has announced that a new midwest sales territory which includes KANSAS, MISSOURI and parts of KENTUCKY and TENNESSEE, MISSISSIPPI and ARKANSAS has been established.

C. B. LANE, newly appointed factory representative will head the new office, with headquarters in Overland Park, Kansas. He was formerly a power transmission equipment salesman for Noelling Steel Sales Corp. in Kansas City.

Hammel-Dahl Names Kone —Texas, Okla., Kansas

HAMMEL-DAHL COMPANY, Providence, R. I., manufacturer of automatic control equipment, announces the appointment of JAMES S. KONE AND COMPANY, AMARILLO, TEXAS, as its representative in TEXAS, OKLAHOMA, and KANSAS.

James S. Kone

The newly appointed company is headed by JAMES S. KONE, and its personnel includes several experienced sales engineers, capable of solving automatic control problems.

Parkersburg-Aetna Merger

Operations of The Parkersburg Rig and Reel Company and Aetna Ball & Roller Bearing Company have been merged to form the PARKERSBURG-AETNA CORPORATION.

A. SIDNEY KNOWLES has been elected chairman of the board of the merged corporation, and WILLIAM A. WOOD, president and treasurer.

The business of the two concerns will be conducted as divisions of the West Virginia corporation. Parkersburg Rig and Reel manufactures equipment used in the production, processing and storage of petroleum products. Aetna manufactures ball and roller bearings and related products.

Parkersburg's plant facilities are located in Parkersburg, W. Va.; Coffeyville, Kansas; Houston, Texas, and Pomeroy, Ohio. Aetna's plant is in Chicago.

New Power Plant—Ky.

KENTUCKY UTILITIES COMPANY, LEXINGTON, KENTUCKY, is planning a coal-fired steam electric plant with an eventual capability of 424,000 kw at Dix Dam, R. M. WATT, K.U. president, has announced.

E. W. Brown

The plant's first unit, capable of generating 106,000 kw, is scheduled to begin operation in 1956. The timetable for installation of the other three units will be determined by the electrical load growth in the area served by the company.

The huge plant, largest in the K.U. system when it is completed, is to be located in Mercer County near the company's hydroelectric station. It is estimated that the plant, with all four units installed, will require 110 operating employees and burn 1,080,000 tons of Kentucky coal a year.

The new plant will be named the E. W. BROWN GENERATING STATION in honor of the company's vice president in charge of operations. Mr. Brown has been with the system since 1917. He is a member of the company's board of directors.

SIMPLIFY and SAVE
on lubricating work with

ALBANY
PRESSUREGREASE
Universal

Hundreds of plants now use this Improved All-Purpose Lubricant for:

Albany Pressuregrease Universal takes the place of four or more separate greases used heretofore . . . cuts down inventory and calls for only one grease gun . . . speeds up lubrication work and saves you money.
Engineers like the way Albany Pressuregrease Universal clings to metal at all temperatures. Its high resistance to moisture prevents rust. Assures cleaner floors because it will not run off at high temperatures or high speeds. Ask for it at your mill supply house.

1. **Regular Pressure Grease**
2. **Ball and Roller Bearing Grease**
3. **Water Pump Grease**
4. **Universal Grease and for many other types of equipment**

ADAM COOK'S SONS, INC.
LINDEN, NEW JERSEY

FREE:
Send today for helpful copy of Albany Recommendation Chart

***Albany* Lubrication Products**

Southern Representatives: **E. E. McCARTHY,** 1312 Poinsetta Ave., Orlando, Fla.
J. H. MENGE CO., 932 Nat'l Bank of Commerce, New Orleans, La.

Attention All "Old Timers" of the Oil Burner Industry

J. W. Owens of The Mercoid Corporation, who is national chairman of the OLD TIMERS' CLUB of THE OIL BURNER INDUSTRY, announces that final arrangements have been made for the Annual Meeting and Dinner Party during the week of the National Indoor Comfort Exposition. The date is Tuesday evening, May 18. Host will be the Philadelphia Rifle Club (7th and Tabor Road, Philadelphia) where the facilities of the Main Dining Room will accommodate over 500 Old Timers (plenty of elbow room for all members).

Plan now to attend—contact either Stanley Czarnecki at the Eddington Metal Specialty Co., Eddington, Pa., or write to the Secretary: H. A. Maccubbin, 120 W. Madison St., Villa Park, Ill.

New Lion Oil Refinery

LION OIL COMPANY, EL DORADO, ARK., has placed in operation its new refinery facilities, constructed at a cost of about $5.5 million, according to T. M. MARTIN, president.

These facilities include a model 4 fluid catalytic cracking unit, vapor recovery unit, alkylation plant, de-ethanizer unit, additional steam generating units and new product storage tanks.

The refinery now has the capacity to manufacture 50% more high-octane gasoline, an increase of more than 187,000 gallons per day, with a corresponding decrease in production of heavy fuel oils.

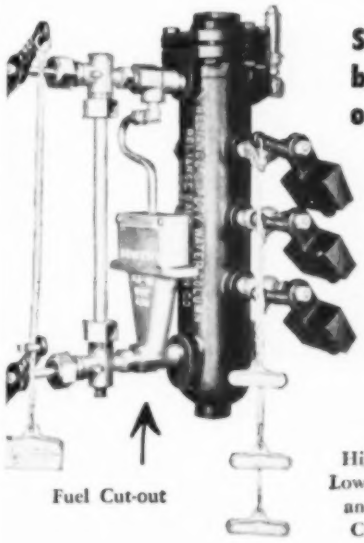
Lummus Company of New York and Houston designed and constructed the new refinery additions.

Trane Co.—South, SW

THE TRANE COMPANY, manufacturers of air conditioning, heating and ventilating equipment, recently announced sales office appointments which include college graduates with degrees in mechanical engineering, who have completed the first six months of the firm's Graduate Training Program. Assignments are: JAMES H. BENNETT, GREENSBORO, N. C.; HARRY N. CASTO, CLARKSBURG, W. VA.; RICHARD L. CLEMENTS, ATLANTA, GA.; TYLER G. HEGENWALD, NEW ORLEANS, LA.; WILLIAM P. HUTCHINS, RICHMOND, VA.; AMOS L. ROBERTS, JR., KANSAS CITY, MO.; and JAMES G. TUTEN, JR., KNOXVILLE, TENN.

New Reliance Levalarms

...simple, safe, sure controls for audible and visible water level alarms and fuel cut-out



Fuel Cut-out

Simple, rugged—unaffected by pressure, temperature or water conditions

High and Low Alarms and Fuel Cut-out

Using isolated circuits of low amperage, the new electrode-type Reliance Levalarms avoid troubles usually encountered with water level alarm and fuel cut-out devices. Without bellows or stuffing boxes; without vacuum tubes or magnets, these controls take their commands direct from the boiler water itself as it rises or falls in the water column.

One style adds the facility of a positive fuel cut-out control to float-operated whistle alarm columns. Other models provide high and low alarm *and* fuel cut-out facilities, and pump cut-in and cut-out if desired. In some instances the new Levalarms can be added to water columns already in service. Their installation is easy for any engineer. Write today for Bulletin D2 covering Electrode-type Levalarms.

THE RELIANCE GAUGE COLUMN COMPANY
5902 Carnegie Avenue • Cleveland 3, Ohio

The name that introduced safety water columns....in 1884

Reliance®

BOILER SAFETY DEVICES

First Full-Scale Atomic Power Plant

By JOHN F. LEE

Associate Professor of Mechanical Engineering
North Carolina State College, Raleigh, N. C.

THE FIRST full-scale atomic power plant will be located in Pittsburgh as part of the power generating system of Duquesne Light Company, according to an announcement from the Atomic Energy Commission. The atomic power plant will have a capacity of at least 60,000 kw and will be completed within the next two years. Duquesne Light Company's bid for the project was selected from a total of ten bids submitted by major power companies. According to Lewis L. Strauss, Chairman of the Atomic Energy Commission, Duquesne's bid was the most favorable to the government.

This pioneer atomic power plant is the same one recently authorized by the Atomic Energy Commission. Westinghouse Electric Corporation was awarded a contract earlier under this authorization to proceed with the design and construction of the reactor.

It is estimated that the reactor alone will cost approximately $30 million of which $5 million will be assumed by Duquesne Light Company. In addition, Duquesne Light Company will build, at its own expense, the rest of the power plant. The reactor, in effect, will replace the steam generator and allied equipment. The rest of the plant is not expected to be very much different from a conventional steam power plant of similar capacity.

The Atomic Energy Commission will furnish enriched natural uranium as the fuel for the reactor and Duquesne Light Company will reimburse the Commission during the first year at the rate of 48.3 cents per million Btu in the steam generated. This rate will increase annually to a top figure of 60.3 cents in the fifth year.

With this announcement of the early development of an atomic power plant, SP&I readers will want to establish a general familiarity with the important aspects of atomic power. "An Appraisal of Atomic Power"—featuring reactions and fuels, coolants, power plant and economics—was published in SP&I for March, 1954, pages 52 through 55.

Operational Data

The reactor will be similar to the one used in the *Nautilus* because both the Atomic Energy Commission and Westinghouse have had more practical experience with this type of reactor. The water used as the working fluid in the power plant cycle will also serve as the coolant for the reactor. However, the generation of steam cannot be permitted to take place in the reactor because of an adverse effect on the nuclear reactions. For this reason the cooling water, which is equivalent to the feedwater in a conventional steam power plant, must be at a sufficiently high pressure to preclude vaporization at 900 F. Hence this type of reactor is known as the "pressurized-water type." A separate flash tank must be provided in order to obtain steam for expansion in the turbine.

Difficult Problems

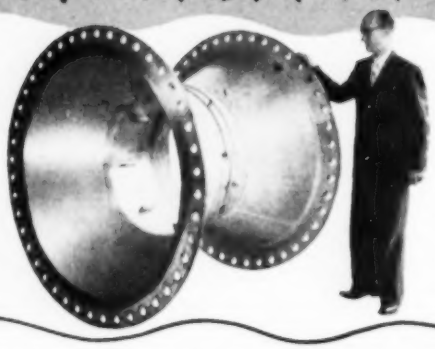
The selection of a pressurized-water type reactor does not imply that it represents the most suitable design for large-scale power plants. In fact it offers two serious disadvantages. In the first place the need for pressurizing the reactor presents a number of design complications particularly in connection with structural materials. In the second place, although pure water is relatively immune to radioactive contamination, the impurities present in water are not. Since the same fluid is used as the working medium in the power plant as well as the coolant in the reactor, it follows that all equipment receiving steam or condensate will be contaminated. This fact poses many difficult maintenance problems.

Other types of reactors are under consideration by the government for possible use in future atomic power plants. The present plant, even though it is full-scale, must be regarded as a research project in atomic power plants. In its design, construction, and maintenance will be found the knowledge that will point the way to low-cost atomic power in the future.

FOR FLOW MEASUREMENT

only the Gentile* FLOW TUBE manufactured by FOSTER offers you all these ADVANTAGES:

*Gen-til-'ly



ACCURACY — Produces differential from points of equal cross-sectional area . . . furnished with head capacity curves, and guaranteed for exceptional accuracy when used with any standard indicating, recording or integrating meter.

LOW HEAD LOSS — Available in several types and D/d ratios to provide differentials that can be accurately measured with least head loss.

LOW INSTALLED COST — Average length is only 1½ times the pipe diameter, and straight runs entering and following are not required unless installed near throttling valves or regulators.

Write for Bulletin FT-101 or specific recommendations

FOSTER ENGINEERING COMPANY

835 LEHIGH AVENUE UNION, N. J.

AUTOMATIC VALVES • SAFETY VALVES • FLOW TUBES

Dravo Moves Atlanta Office

DRAVO CORPORATION, Pittsburgh, Pa., announces that its ATLANTA, GA., office under the supervision of WILLIAM W. TIMMIS, JR., has been moved to Room 361, 1401 Peachtree Street, N. E.

WHEELER M. BEARDEN, formerly of the Pittsburgh office, has joined the Atlanta office, which handles the sales and services of warm air space heaters; crane cab and steel mill pulpit air conditioners; pre-fabricated piping; and construction services.

Elliott Co.—La., Ga.

ELLIOTT COMPANY has announced the opening of a new sales office at 256 Lee Circle Building, NEW ORLEANS, LA., to service Southern Mississippi and Louisiana. Its staff includes G. C. BAYLES as manager, and C. W. BRITT, JR., both formerly in the company's Atlanta office.

F. L. Humphrey, Jr. & G. C. Bayles

F. L. HUMPHREY, JR., was named assistant district manager in the Atlanta territory. He joined the company in 1938 following his graduation from Georgia Institute of Technology as an electrical engineer. After completion of the Elliott training program, he was assigned to their Atlanta office as a field engineer.

Chicago Bridge & Iron—Ga.

GROVER CAMPBELL has been transferred from the general sales office of the CHICAGO BRIDGE & IRON COMPANY in Chicago to its ATLANTA sales office located in the Healey Building.

Mr. Campbell was graduated from Alabama Polytechnical Institute with a B. S. degree in Mechanical Engineering. He joined the Chicago Bridge & Iron Company in January, 1948, and worked at their Birmingham plant until September, 1953, and in the Chicago General Sales office until his transfer.

In his new position he will assist M. G. MITCHELL, Manager, and J. W. HOERNER and B. J. JENKINS, Contracting Engineers.

This has been proved many times over in plants such as this because ALL Subox & SubaLox PAINTS

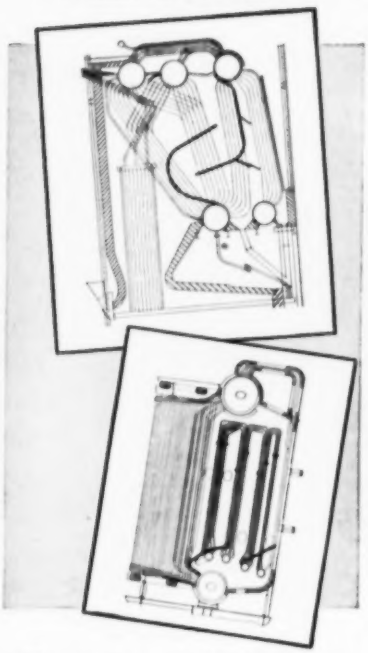
1. Contain lead-suboxide... Dependably protect against rust and corrosion.
2. Can be used as a complete paint system or over standard shop primers.
3. Are decorative in appearance, washable and easy to keep clean.
4. Available in a variety of attractive metallic colors, neat but not gaudy—blend well with wall and floor tiles.
5. Are equally satisfactory for weather exposure and interior use.
6. Can be applied by brush, spray or dip with minimum fire hazard.
7. Are economical in cost... have long life... assure minimum maintenance.

With these characteristics, a single coat of Subox or Subalox often suffices, or two coats will frequently replace the usual three.
Write for "PLAN PAINTING OF NEW PLANTS TO REDUCE COSTS"

Subox Inc.

6 Fairmount Plant, Hackensack, N. J.

ONLY ENCO BAFFLES give you all these COST CUTTING FEATURES



These important fuel-saving maintenance-reducing features are obtainable with Enco boiler baffles—*and only with Enco baffles.*

- **Streamlined gas flow**
- **Uniform gas flow**
- **Elimination of bottlenecks**
- **Reduced draft losses**
- **Higher heat transfer**
- **Cleaner heating surfaces**
- **Less use of soot blower**
- **Special provision for expansion**
- **Easy tube replacement**
- **Adaptable to any water-tube boiler, fired by any fuel**

Each application is designed on the basis of more than a quarter century of experience in this specialized branch of power engineering. Installations are made by skilled mechanics.

THE ENGINEER CO.

75 WEST STREET, NEW YORK 6, N.Y.

In Canada: Rock Utilities Ltd., 80 Jean Talon St. W., Montreal, P. Q. EC-806

News for the South and Southwest (continued)

Hale Retires from Fulton Bag

The retirement of STEPHEN C. HALE, chief engineer at FULTON BAG AND COTTON MILLS since 1932, has been announced.

Mr. Hale is a past president of the Georgia Society of Professional Engineers and has also served as vice president of the National Society of Professional Engineers.

A graduate of Cornell University, he became resident engineer for the International Paper Company at Bellows Falls, Vt., in 1913. The following year he joined the Beechnut Packing Company at Rochester, N. Y., as assistant factory manager. In 1922 he became superintendent of construction and maintenance with Ludlow Manufacturing Associates in Ludlow, Mass. He was manager of the auxiliary division of Cheney Brothers Silk Manufacturers at Manchester, Conn., prior to becoming chief engineer with Fulton.

Mr. Hale will continue to serve the company on a consulting basis.

Robert H. Morse III, general manager, Beloit Works; *Robert H. Morse, Jr.*, president; *W. B. Wylly*, manager, Atlanta Branch, receiving the Cup; *Henry J. Barbour*, manager, sales promotion and public relations; *W. B. Morse*, manager, Detroit Branch; *Colonel Robert H. Morse*, chairman of the board; *H. H. Bradley*, honor salesman of Atlanta Branch; and *J. A. Cuneo*, general sales manager.

Atlanta Branch Wins Annual Fairbanks-Morse Award

The new silver trophy for top sales performance in 1953 was presented recently to W. B. WYLLY, manager of the Atlanta Branch of FAIRBANKS, MORSE & Co., Chicago manufacturers of diesel engines, locomotives, scales, pumps and electric machinery, at a special dinner in the Henry Grady Hotel, Atlanta.

The Colonel Robert H. Morse Cup, as the new trophy is called, was presented by Colonel Morse, chairman of the board of the company, to Mr. Wylly and his Atlanta sales organization. About one-hundred guests attended the celebration.

Twenty-one years ago Colonel Morse first awarded a trophy called the President's Cup to the branch house enjoying the largest volume of sales in relation to its annual quota. During this period the Cup has been awarded to eleven of the company's sixteen branches. This is the first time the Cup was won by the Atlanta Branch.

H. H. BRADLEY, top salesman of the year for the Atlanta Branch, had his name inscribed on the Cup alongside that of Manager Wylly's.

In commenting on the award to the Atlanta organization, Robert H. Morse, Jr., president, said that he was most optimistic about the future of the South. Said Mr. Morse, "I believe the success of the Atlanta Branch is a signpost denoting the trend of our nation's industry and business progress in the South. Sales of the company's product in this area increased about one-third over sales of a year ago."

LeTourneau Promotes Clark

HARRY S. CLARK has been appointed General Manager of the LONGVIEW, TEXAS, plant of R. G. LETOURNEAU, INC.

In addition to Clark's new responsibility as Plant Manager, he retains the assignment as Manufacturing Manager, which he has held since 1952. He will be responsible for the production of several new lines of heavy duty electrically powered and controlled equipment for the land clearing, materials handling, marine, and heavy off-road transport fields.

Before becoming Manufacturing Manager, Clark had supervised construction and operation of the LeTourneau steel mill at Longview. He first joined the organization in 1941 to supervise 155 mm shell manufacture, then became supervisor of various other production departments.

Worthington's Alabama Plant Producing Unit Conditioners

Shipment of 3 and 5 ton commercial air conditioners from WORTHINGTON CORPORATION'S unit air conditioner fabricating plant in DECATUR, ALABAMA, commemorates another milestone in the company's history. The new Decatur plant was completed sufficiently to get this first shipment out in 147 working days from the time the building of the plant was started from scratch.

Construction techniques employed in the 170,000 sq ft factory building were featured in SP&I for January, '54, pages 54 and 55. Fabricating operations in the Decatur, Alabama, plant are under the direction of RUSSELL MCBATH, works manager, and WILLIAM JOHNSON, factory superintendent.

First truckload of unit air conditioners was loaded and shipped early in March from Worthington's Decatur, Alabama, plant.

A pinch of this and that . . . won't do!

The world's great bakers steer away from grandma's *pinch of this and that* methods . . . it takes superior ingredients combined to exacting recipes to produce perfect results every time.

So, too, with any refractory installation . . . Plibrico gives you all the ingredients for a perfect job: the right products, creative engineering, installation by expert crews. *Only* Plibrico gives you all three . . . but when you call for Plibrico service, you *know* you're getting your money's worth!

For superior performance . . . PLIBRICO REFRACTORY PRODUCTS
For superior service . . . PLIBRICO ENGINEERING AND CONSTRUCTION

Plibrico Company

1838 North Kingsbury Street, Chicago 14, Illinois
PLIBRICO SALES & SERVICE IN PRINCIPAL CITIES

THE
"ACTION" CATALOG

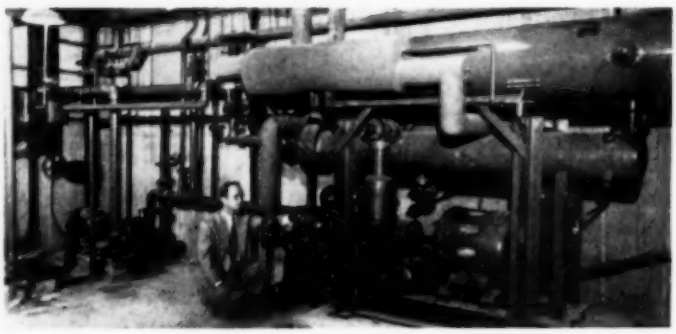
for men of management who are willing to find out how much money these tools can make for their company by simply routing this new "Action" Catalog to Working Heads of Plant Departments.

Not because we say so, but because we sincerely believe that if you do so, your men-on-the-job will tell you how this long-famous line of many-use hand power metal cutting tools will save you money.

Porter Cutters can save hours of labor, reduce shutdown time, solve emergency problems, do the work where other cutting methods are difficult or impossible.

Write for one or more "Action" Catalogs for your plant — or ask your Distributor.

H. K. PORTER, INC.
76 Foley St., Somerville 43, Mass.



The air conditioning system was designed by William M. Wallace, of Durham, N. C. Installation was made by the Pinnell Heating and Air Conditioning and Modern Roofing and Sheet Metal Works. Both firms are Augusta, Ga., Chrysler Airtemp dealers. J. C. Mock, president of Modern Roofing and Sheet Metal Works, is inspecting the installation.

Air Conditioning System for Georgia Hospital

Heart of the central station duct system in Augusta, Georgia's St. Joseph's Hospital, is a Chrysler Airtemp 40 hp dual radial water chiller. A network of large air ducts distributes the tempered air throughout the air-conditioned area.

In year-around operation, chilled water or steam is pumped to an air washer where the air is blown through for cooling or heating. The air then is passed over a reheat coil where proper humidity is maintained. From the reheat coil, the air is passed through an electrostatic air precipitating filter then into the central air distribution system.

In the winter cycle, a humidistat located in the exhaust duct resets a dew-point thermometer (normally set at 61 F) to produce the desired humidity. It regulates the re-heater steam valve, which oscillates from 3 to 6 lb, while holding the cooling valve closed to cooling water. When outside air temperature descends below 70 degrees, the outside thermostat resets the delivered air thermostat to 68 F in the winter, which regulates the reheater valve.

If necessary, the air is reheated by the booster coil, which is controlled by one of the seven room thermostats, through a valve to maintain 76 F drybulb. As either drybulb or humidity conditions vary, the system automatically switches over to summer control.

In the summer cycle a humidistat resets the dew-point thermostat to a lower temperature, which causes a valve to close as water pressure increases to seven pounds. Thereupon the controls are actuated to start the air conditioning equipment and open a three-way valve, oscillating from 7 to 12 lb, to cooling water, thus maintaining dew-point and relative humidity.

When the outside air thermostat reaches 78 F, it resets the discharge thermostat to 63 F which regulates the reheat valve.

If necessary, the air is then reheated by the booster coil under the control of one of the seven room thermostats through the valve to maintain 78 F. If the equipment is not capable of maintaining this temperature due to temporary excessive local conditions, it will be out of control on drybulb. But even under such maximum conditions, a room temperature of 80 degrees will not be exceeded.

Under normal conditions a mixture of 50% outside and 50% return air is conditioned and distributed. Outside air passes through fiber glass filters before entering the system. Return air is passed through a charcoal-cell type filter to remove hospital odors. When necessary, the system can automatically consume 100% outside air.

J. E. Sirrine Co. Makes Personnel Changes—S.C.

J. E. SIRRINE COMPANY, GREENVILLE, S. C., has announced the retirement from the partnership of MR. C. R. MACDONALD.

Three new partners recently added to the firm are JOHN H. BRINGHURST, JR., HARRISON S. FORRESTER, and MURRAY M. STOKELY.

El Paso Engineers Hear Rosch of Anaconda W & C

S. J. ROSCH, consulting engineer for ANACONDA WIRE & CABLE CO., Hastings-on-Hudson, N. Y. was guest speaker recently before the annual joint meeting of the El Paso Chapters of the American Institute of Electrical Engineers and the Institute of Radio Engineers.

S. J. Rosch at El Paso Meeting

Mr. Rosch addressed the group on "The World in the Next Quarter Century," suggesting the part that scientific advances would play upon listeners' lives in the future, emphasizing particularly what they might expect wire and cable to be like 25 years hence.

President of the El Paso section of the AIEE is Russell L. Riese of New Mexico A&M College. Wendell B. Sell, of Ft. Bliss, is president of the El Paso section of IRE.

Cope Appoints Gearhart, Fla.

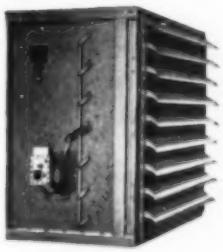
T. J. COPE, INC. of Philadelphia, Pennsylvania, manufacturer of power installation tools and equipment and Cone Expanded Metal Cable Trough announces the appointment of the JACKSONVILLE, FLORIDA, office of GEARHART COMPANY OF ATLANTA, GEORGIA, as sales representatives in Florida. The Gearhart Company will continue to represent Cope in the territory of Georgia, Alabama, and Eastern Tennessee.

Beckett-Harcum, Birmingham

THE BECKETT-HARCUM COMPANY, 1087 Wayne Road, Wilmington, Ohio, has announced the opening of a branch office at Suite A-3, 1727 Sixth Ave. North, BIRMINGHAM, ALABAMA, to offer a complete line of air and hydraulic control equipment. H. H. HACKETT heads the new office as Southern Manager.

When air is exhausted from paint spray booths, from grinding, casting, chemical processing or other plant operations or is used in combustion, it must be replaced. Wing Fresh Air Supply Heaters provide the finest means of replacing exhausted air and supplying fresh air at the right temperature, winter and summer.

WING FRESH AIR SUPPLY HEATERS



WING FRESH AIR SUPPLY HEATER for Window or Wall Mounting

At left is shown Fresh Air Supply Heater for mounting in roof or monitor opening.

require no extensive duct work. They are mounted in window or wall openings or below roof or monitor openings.

HOW THEY WORK. They draw in the outside air at prevailing outside temperature and pass it through multiple by-passes and heating elements which are always under full steam pressure.

THEY CANNOT FREEZE. The heating coils can never freeze as they can where temperatures are controlled by throttling the steam supply.

UNIFORM DISCHARGE TEMPERATURES. The discharge airstream is uniform in temperature because of Wing's unique design and construction which combine several alternating by-pass and hot air passages. The multiple thin layers of hot and cold air mix almost instantly assuring uniformly warm air at the outlet.

Write for Bulletin

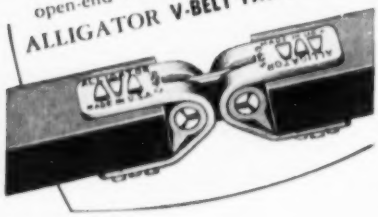
L. J. Wing Mfg. Co. 169 Vreeland Mills Road, Linden, N.J.

Factories
Linden, N.J. & Montreal, Canada
In Europe: Etab. Wanson,
Brussels, Belgium

SEVENTY-FIVE YEARS AGO
Three years before 1879, when the L. J. Wing Mfg. Co. was founded, President Grant and the Emperor of Brazil started the great Corliss Engine shown above, thereby opening the great Centennial Exposition in Philadelphia, symbolizing the new industrialism that was to transform America and the world.

If the correct size of endless V-Belt is not readily available, or if you have to tear down machinery to install, then the best belt to use is open-end V-Belting fastened with

ALLIGATOR V-BELT FASTENERS



★ In this way you can make up V-Belts in *any length* to fit *any drive* the fast economical way — V-Belts that perform exceptionally well.

★ In contrast to link-type belts these ALLIGATOR fastened V-Belts have just *one* strong joint . . . *stretch and follow-up maintenance are reduced to a minimum.*

ALLIGATOR **INTRODUCTORY V-BELT DRIVE UNITS** contain V-Belting, Fasteners and Tools — everything you need in one compact package to make up V-Belts quickly. Available in sizes A, B, C & D.

Ask for Bulletins V-215 and V-216
Order From Your Distributor

FLEXIBLE STEEL LACING COMPANY
4625 Lexington Street, Chicago 44, Illinois

ALLIGATOR
V-BELT FASTENERS

News for the South and Southwest (continued)

Anderson Brass—Carolinas

JAMES B. RICHARDSON, with headquarters in COLUMBIA, S. C., has been appointed by ANDERSON BRASS WORKS, INC., BIRMINGHAM, ALABAMA, to handle their full line of distributor products in the Carolinas.

Mr. Richardson is a graduate of the University of Florida. For the past four years he has represented several manufacturers out of his own office at Columbia.

Barber-Greene Southern Area

BARBER-GREENE COMPANY, Aurora, Ill., manufacturers of bituminous mixing and paving equipment, belt conveyors, loaders and ditching machines, have announced the appointment of JOHN KOCSIS to be their Service Manager for the Southern area.

John Kocsis

Mr. Kocsis will be responsible for the service supervision representatives in FLORIDA, GEORGIA, ALABAMA, MISSISSIPPI, the CAROLINAS, and TENNESSEE, with headquarters in Atlanta.

Mr. Kocsis replaces RALPH HENRICKS who has been Barber-Greene's Area Service Manager in Atlanta since 1946. Mr. Henricks has been transferred to the company's general offices.

Foreign Trade Center at Instrument Exposition

A Foreign Trade Center will be set up at the First International Instrument Congress and Exposition in Philadelphia, September 15th to 21st inclusive, which is sponsored by the INSTRUMENT SOCIETY OF AMERICA. The Foreign Trade Center will be under the direction of Ballagh & Thrall, Export Sales Managers, Philadelphia, Pa.

A symposium will be arranged on foreign trade, covering the various methods of developing export business and instrument manufacturers interested in export trade can call at the Foreign Trade Center to discuss specific problems with consultants which will include bankers, freight forwarders, custom brokers, etc.

A panel discussion will cover other phases of foreign trade: export and import licenses, foreign exchange, problems of importers, etc. Interested persons are cordially invited to attend.

Philips Names Schueter, Tulsa

W. A. SCHUETER, well-known Oklahoman, has been appointed dealer in the Southwest for products of the Research & Control Instruments Division, NORTH AMERICAN PHILIPS COMPANY, INC.

The new organization is known as the SOUTHWESTERN ELECTRONICS CORPORATION, 3920 S. Peoria Ave., TULSA.

DONALD HAMPTON and MRS. HAZEL PARKER are members of the Tulsa staff for the territory which includes OKLAHOMA, KANSAS, ARKANSAS and the northern part of TEXAS.

Wool Process Plant—S. C.

Foundations have been poured in JOHNSONVILLE, SOUTH CAROLINA, for a $3 million wool combing plant to house the first wool processing unit in the state. It will be capable of turning 20 million pounds of processed wool a year into "tops," the product that goes to customer's plants for spinning and weaving.

The single-story plant will be occupied by Wellman Combing Company, a subsidiary of Nichols & Co., Inc., of Boston, the largest wool treatment concern in the country.

Expected to be completed and ready for occupancy about July 1, the plant will have a first unit of some 150,000 sq ft, and is laid out for great enlargement as demand for its product develops in the Southeast. It will be totally enclosed and air conditioned throughout. More than 250 persons will be employed in the first unit.

Lockwood Greene Engineers of New York, Boston, and Spartanburg, S. C., is the architect on the project and Daniel Construction Company, Greenville, S. C., and Birmingham, Ala., the builder.

New Clark Thread Plant Completed at Toccoa, Ga.

COATES & CLARK, INC.'s new $5,000,000 dyeing and finishing plant at TOCCOA, GA., has been completed, according to an announcement by DANIEL CONSTRUCTION COMPANY of Greenville, S. C., and Birmingham, Ala., general contractor for the project.

The 620' x 440' air conditioned plant will be used to dye, finish, and package thread. Bleaching, warping, and gassing operations will be done here.

Equipment in the new plant includes 14 Model T3 quillers, 40 50-gum cone winders, 56 #50 winders and 91 #12 Universal winders. A large warehouse area for storing raw materials and finished thread, and a partial basement with space for a cafeteria, locker rooms, service area, are among the features of the building.

J. E. SIRRINE COMPANY of GREENVILLE, S. C., was project engineer.

Durkee-Atwood, Southeast

DURKEE-ATWOOD COMPANY, Minneapolis, has announced the appointment of the following companies as exclusive industrial V-belt distributors in their respective areas: CAROLINA RUBBER SUPPLY CO., GREENSBORO, N. C.; CAROLINA BELTING CO., GREENVILLE, S. C.; ROANOKE BELTING & RUBBER CO., ROANOKE, VIRGINIA; HUNTER ELEC. MOTOR SERVICE, COLUMBUS, GEORGIA; and PRECISION GEAR & MACH. CO., CHARLOTTE, N. C.

CP&L to Utilize Microwave Radio

CAROLINA POWER & LIGHT COMPANY is installing microwave radio—only recently released for power company use—between RALEIGH and its new generating plant near WILMINGTON, NORTH CAROLINA.

CP&L's system contains five towers 200 and 250 ft high, two being terminals at Raleigh and Wilmington with repeater equipment at Erwin, Clinton and Wallace. Spaced about 30 miles apart, the towers provide line-of-sight paths for relaying high frequency radio signals. These are converted to telephone circuits at "take-off points."

BLAIR JENKINS, JR., communications engineer for CP&L, said the system eventually will be capable of handling as many as 30 simultaneous two-way conversations.

PORTFOLIO OF BIRD-ARCHER ENGINEERING SERVICES FOR WATER TREATMENT

For experienced counsel and personal attention to water or steam problems at your plant, it will pay you to call on Bird-Archer's qualified engineers. Highest quality chemicals and over sixty years experience assure maximum results with Bird-Archer's Complete Water Treatment Service.

PLANT SURVEY
Studies of your use of water or steam equipment and past performance.

WATER AVAILABILITY STUDY
Analysis of water supplies starting at source.

LABORATORY SERVICE
Experienced chemists specialize in scientific water analyses and research.

DEVELOPMENT OF TREATMENT AND CONTROL SYSTEMS
Operational changes where necessary.

CHEMICAL TREATMENT FORMULATION
Bird-Archer custom formulates chemical treatments for your specific problems.

EQUIPMENT RECOMMENDATIONS
Specification and furnishing of additional equipment when necessary, including complete analysis of savings and benefits made possible.

PLANT STAFF INSTRUCTION
Experienced technicians instruct your personnel in accurate control and test procedures.

PERIODIC CHECK-UPS
Personal call-backs to your plant by a Bird-Archer Service Engineer to assure best possible results.

WRITE FOR LITERATURE

ENGINEERING PLUS CHEMISTRY EQUAL BIRD-ARCHER SERVICE
For Power For Process For Cooling

BIRD-ARCHER
WATER TREATMENT
THE BIRD-ARCHER COMPANY, 4337 N. AMERICAN ST., PHILADELPHIA 40, PA.
NEW YORK • CHICAGO
IN CANADA: The Bird-Archer Co., Limited, Cobourg, Ontario
BIRD-ARCHER COMPANY OF CALIFORNIA, San Francisco

Catawissa
PERFECT SEAL
Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!

Standard & Double Extra Heavy
UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 3"; 6000-lb. sizes ⅛" to 2".

ORIFICE UNIONS

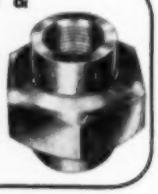
With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

MALE & FEMALE UNIONS

With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



Write for your free copy of CATALOG 11 for complete information

CATAWISSA VALVE & FITTINGS COMPANY
950 MILL ST. • CATAWISSA, PA.

News for the South and Southwest (continued)

Worthington Engines—Miami

In the City of Miami's new, twenty-four million dollar sewage treatment plant now under construction, five Worthington dual fuel engines will contribute to keeping the beaches free from contamination.

One of the engines—a 7-cylinder dual fuel 480 hp machine will drive an E-M generator to supply electric power to the plant.

Four 6-cylinder 410 hp engines will drive the blowers to activate the sewage sludge beds. Two of these will be dual fuel engines and two will be straight gas spark ignition engines. All of the engines will operate at 514 rpm. The engines will be fueled by the gas generated from the digested sludge, after aeration by the blowers driven by the engines. The dual fuel arrangement permits changing over from gas to oil, or any combination of the two fuels, as variable conditions may require.

The plant itself will be located on Virginia Key in Biscayne Bay, and the effluent, after treatment, will flow out to sea.

In the treatment plant, approximately thirty Worthington pumps will be installed to handle sludge, effluent, and other liquids.

New Plant for Alton Brick Opens in St. Louis County

Erection of a new $500,000 brick manufacturing plant for the ALTON BRICK COMPANY of Alton, Ill., in Maryland Heights, ST. LOUIS, MO., has been announced by the LURIA ENGINEERING COMPANY of Bethlehem, Pa., producer of standardized steel industrial buildings.

The plant houses a huge tunnel kiln, designed to provide for automatic transfer of bricks from the producing machines to rail cars, thus eliminating manual handling in this operation.

The steel-frame structure is a standardized Luria type adapted to the company's requirements. It consists of two attached 60 ft wide, clear-span buildings, each 16 ft high to the eaves. The framework has a covering of corrugated aluminum.

Fluid Drive Installation—Kentucky

DISTILLERY mash tubs require a drive that will readily overcome a heavy inertia load and also handle loads of widely varying magnitude. The mash, which is agitated several hours, varies from a slurry liquor to a pasty mass.

Double Springs Distillers, Incorporated, Bardstown, Kentucky, converted their steam engine mash tub drive to an electric drive consisting of a 30 hp motor and Link-Belt fluid drive, double reduction herringbone gear drive, gear-type couplings and bevel gears. Their mash tub, mounted on the floor above, has a capacity of 14,100 gallons, with a 3 15/16 in. diameter agitator shaft. it agitates the mash for about three hours.

The resulting advantages over the steam engine drives commonly used in the past include smoother running, reduced power consumption, savings in space and less maintenance.

Bark-Burning Boiler—Mobile

A new bark-burning boiler has been completed at the MOBILE, ALABAMA, pulp and paper mill of HOLLINGSWORTH & WHITNEY COMPANY.

The boiler is a single pass boiler with swaged tubes. It was built by Combustion Engineering-Superheater, Inc.

The boiler plant building and accessory layout was designed and constructed and the boiler was installed by The Rust Engineering Company.

The new unit represents a distinct improvement over older methods of burning bark for steam generation, being one of the first of its type to utilize a new method of firing that gives practically complete combustion with a minimum of excess air and consequent high efficiency.

Instead of pile or grate burning the bark is shredded and introduced to the furnace through a high set spreader stoker. The bark is largely burned in suspension after passing through a zone of direct contact evaporative drying. Turbulence nozzles inject air to help keep the bark in suspension, and the firing is under full automatic control.

Furnace consumption is estimated at 53,000 lb/hr of bark (at 50% moisture) in combination with natural gas. When barking drums (supplying the bark) are not operating the furnace is carried full load on gas. Oil can be used as a standby for the gas.

New Power Plant Slated for Gulfport-Biloxi Area—Miss.

L. P. SWEATT, president of MISSISSIPPI POWER COMPANY, has announced that the company plans to build a huge generating plant on the Gulf Coast. The initial unit will have a capacity of approximately 100,000 kw with the design providing for an ultimate capacity of 500,000 kw. Cost of the first unit is estimated to be approximately $15,000,000.

Seven hundred acres of land has been acquired on Big Lake, Biloxi River and Fritz Creek for the plant site. Exploratory work to determine the best foundation location will be undertaken in the near future. The site of the proposed plant is about three miles north of Highway U. S. 90 midway between Gulfport and Biloxi.

The plant will be so designed that natural gas, oil or coal can be used as fuel. Construction of plants of this type generally require about three years, Mr. Sweatt stated.

"Electricity and Electrical Power"

Basic information on the fundamentals of electricity for the first time available in ONE Volume!

A limited edition of this important handbook has just been printed and is available to subscribers to SOUTHERN POWER AND INDUSTRY only. Order your copy NOW with a new or renewal subscription to this magazine.

A series of seven articles, "Electricity and Electrical Power" by Roy W. Wages, industrial engineer for Georgia Power Company, was published last year in SOUTHERN POWER AND INDUSTRY and received wide attention and favorable comment from plant engineers in the South and Southwest.

Demands for reprints of this series became so great that we have had all the articles bound in one volume. This useful 72-page book is now available to SOUTHERN POWER AND INDUSTRY subscribers exclusively.

In simple, practical terms, Mr. Wages makes clear the mysteries of electricity all the way from explaining and defining a volt to a discussion of the sine curve of alternating current motors. The book is liberally illustrated with diagrams and pictures which help make the text crystal clear. Throughout the pages, the author does everything possible to simplify the presentation of facts for easy study and understanding.

Here is a book you will want to keep for reference and for training periods. Pocket sized, it is convenient to carry anywhere . . . for checking right on the job.

All you have to do to own this valuable booklet is to check the coupon below now, and send it back to us. For three dollars, you get a three-year subscription to SOUTHERN POWER AND INDUSTRY *plus* "Electricity and Electrical Power"!

The editors will welcome you into the growing family of SOUTHERN POWER AND INDUSTRY readers.

Yes! I accept your invitation. You may enter my 3-year subscription to SOUTHERN POWER AND INDUSTRY and send me my personal copy of Electricity and Electrical Power at the special combination rate of $3.00.

☐ Enclosed find $3.00 ☐ Send bill for $3.00

NAME .....

ADDRESS .....

CITY ..... STATE .....

CLASSIFICATION DATA

If an individual give name of firm connected with and title of position.

Firm ..... Position .....

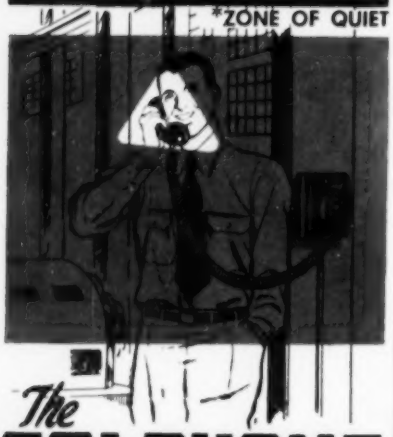
Products manufactured or nature of business .....

Enclose coupon with remittance. If you want to be billed, send coupon alone.

SOUTHERN POWER & INDUSTRY

806 Peachtree Street N.E. Atlanta 5, Georgia

the PHONE with * THE Q-ZONE LICKS NOISE!



The GAI-PHONE
ELECTRONIC TELEPHONE
MAKES COMMUNICATION POSSIBLE IN EXTREMELY NOISY AREAS

Providing dependable telephone service into and from noisy areas *without sound-proof booths*, the GAI-PHONE is operated and connected like a conventional telephone. Designed for dial or manual operation, desk-top or wall mounting, it can be mixed with conventional telephones in the same system. The adjustable transmitter and receiver levels, as well as the adjustable side-tone level, not only assures the greatest operating comfort in noisy areas, but makes the GAI-PHONE very effective over long lines *without repeaters*. Rugged trouble-free design assures long life.

MODEL 200

Designed for wall or column mounting, this model can be used in many noisy locations where a sound-proof booth is not only undesirable but impractical. For example, when equipped with retractile cord (illustrated) and installed on Boiler Control panel, operator's freedom of action and effectiveness are increased greatly.

MODEL 100

Combining all of the GAI-PHONE'S operational features with modern, streamline design makes this model ideal for desk or table top installation.

GAI-TRONICS CORPORATION
READING, PENNA.
A SUBSIDIARY OF GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS

FOR FREE BOOKLET WRITE DEPT. SP

News for the South and Southwest (continued)

Link-Belt—Birmingham

LINK-BELT COMPANY has announced the appointment of J. ROSS ARNOLD as district manager at BIRMINGHAM, ALA., with offices in the Comer Building. Mr. Arnold, who has been a district sales engineer at the company's Pittsburgh office since 1952, succeeds Harry G. Andersen, who was recently appointed district manager at Newark, N. J.

J. Ross Arnold

Mr. Arnold joined Link-Belt in 1937. After working in various departments of the Philadelphia plant, he served as a district sales engineer at Buffalo before being transferred to Pittsburgh.

Beaumont Birch—St. Louis

ROSS IRWIN EQUIPMENT CO., 713 Ambassador Bldg., ST. LOUIS, MO., have been appointed representatives for BEAUMONT BIRCH CO., in the St. Louis area.

Beaumont Birch manufactures a complete line of coal, ash and chemical bulk materials handling equipment. Ross & Irwin have represented Beaumont Birch in the Springfield, Ill., area for several years, and the appointment is an extension of their representation.

Annin Co.—Ga., Ala.

WARD K. STALLINGS COMPANY, 1145 Peachtree St., N. E., ATLANTA, GEORGIA, will represent THE ANNIN COMPANY, Los Angeles, manufacturers of Annin Domotor Valves and other process equipment, in Georgia, Eastern Tennessee, and Northern Alabama.

FRANK A. THOMAS COMPANY, SPRING HILL, ALABAMA, will represent Annin in Southern Alabama, Western Florida and Eastern Mississippi.

Westmoreland Coal Co. Has 100th Anniversary

WESTMORELAND COAL COMPANY is celebrating its 100th Anniversary in 1954, according to GENERAL COAL COMPANY, Philadelphia, Pa., exclusive sales agent for Westmoreland.

The company still has large reserves in Pennsylvania and expects to continue to operate there for many years, but as production tends to decrease in that area it will be more than offset by increased production at the new Hampton Mines in WEST VIRGINIA.

VEPCO 1954 Construction

THE VIRGINIA ELECTRIC AND POWER COMPANY will spend about $53,000,000 on construction during 1954, according to Jack G. Holtzclaw, president.

Approximately $27,000,000 of the total budget is earmarked for new power generating facilities, including work on the hydro development at ROANOKE RAPIDS, N. C.; completion of the second 100,000 kw generating unit and heavy fuel oil system now under construction at the PORTSMOUTH, VIRGINIA, power station; and a third unit now under construction at the Possum Point power station near QUANTICO, VIRGINIA.

Included in the appropriation is $1,050,000 for building 431 miles of new rural lines throughout the company's service area comprising most of the State of Virginia, part of West Virginia and Northeastern North Carolina.

News of Manufacturers

M. NIELSEN, vice president of THE BABCOCK & WILCOX COMPANY, has been elected a member of the board of directors and placed in charge of the Boiler Division. W. D. SULLIVAN has been elected a vice president and is in charge of the manufacturing department of B&W's Boiler Division, and J. P. CRAVEN has been named superintendent of its erection department.

BUCHANAN ELECTRICAL PRODUCTS CORPORATION, Hillside, N. J., has named JAMES O. JOHNSON as general sales manager, to have charge of internal and external sales operations and all phases of advertising, publicity, and sales promotion.

Cooling Tower Officers

NEAL B. LAUBACH of HUDSON ENGINEERING CORPORATION, HOUSTON, has been elected president of the COOLING TOWER INSTITUTE, the nation-wide association of manufacturers of industrial water cooling equipment.

Other new officers include: PAUL R. HOFFMANN of LILIE-HOFFMANN COOLING TOWERS, INC., of ST. LOUIS, vice-president; CLAYTON E. PICKUP, THE FLUOR CORPORATION, LTD., LOS ANGELES, secretary; and ROBERT R. PABODIE of UNITED COOLING TOWER CO., KANSAS CITY, MO., treasurer. President for the 1953 term was LEON T. MART of THE MARLEY COMPANY, KANSAS CITY, MO.

The Institute is now developing a field testing technique for industrial cooling towers with specially designed test instruments which have been assembled in the Houston area.

Annual NSPE Meeting in June

The twentieth annual meeting of the NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS will be held in Milwaukee, Wisconsin, June 9-12, according to an announcement made at the Society's Washington, D. C., headquarters by Paul H. Robbins, the organization's executive director.

Engineer-members of the thirty-nine State Societies affiliated with NSPE will assemble in Milwaukee's Schroeder Hotel to hear National Society officers and committee chairmen report on the past year's accomplishments and exchange views on topics of general interest to the profession.

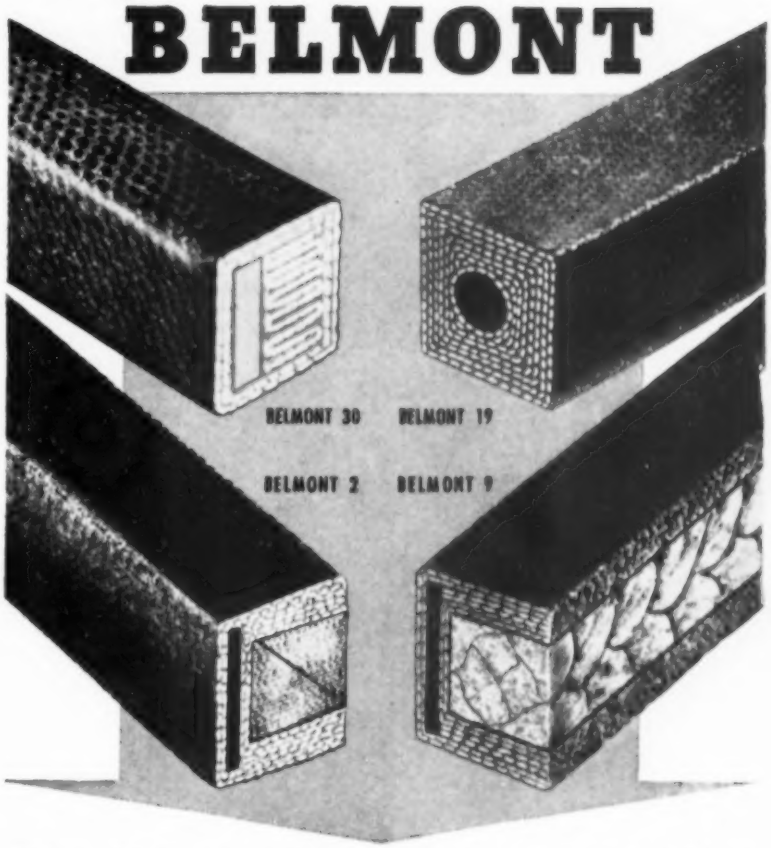
One feature of the meeting will be the installation of new national officers for the 1954-55 administrative year. T. CARR FORREST, JR., a prominent engineer of DALLAS, TEXAS, is currently serving as president of the National Society, and he will preside at the general business and professional sessions during the Milwaukee meeting.

Peerless Pump—La.

THE PEERLESS PUMP DIVISION, FOOD MACHINERY & CHEMICAL CORPORATION has announced the appointment of SOUTHERN ENGINE AND PUMP COMPANY, 1119 Central Avenue, NEW ORLEANS, LOUISIANA as exclusive distributor in Southern Louisiana for sales and service of their complete line of industrial pumps, both vertical and horizontal.

S. R. CARRINGTON is manager of the Louisiana operation. CHARLES J. UTHOFF is in charge of the local New Orleans branch.

They come from
BELMONT



The Home of Packing Specialists

Any BELMONT Packing, properly fitted, outlives its original cost value many times over because of its longer lasting endurance and reliability.

Where GOOD LONG-LIVING QUALITY is a *MUST* — THERE IS A BELMONT PACKING OR GASKET TO FIT YOUR *EVERY* NEED! Whether for minimum hot or cold oil penetration and saturation . . . For maximum resistance against extreme temperature changes . . . For a higher flexibility and resiliency on high pressure steam rods and hammers, expansion joints, air rods . . . For more continuous free motion of shafts working against steam, hot or cold water, oil, acids . . . in fact, for *all* types of Packing services, you'll always find a BELMONT standard or specially constructed BELMONT PACKING to answer your problem

WRITE US FOR THE NAME AND ADDRESS OF YOUR NEAREST BELMONT DISTRIBUTOR. 4-P-5

THE BELMONT
PACKING and RUBBER CO.
Butler and Sepviva Streets
Philadelphia 37, Pa.
FOR STEAM • WATER • OIL • GAS
AIR • ACIDS • ALKALIES • AMMONIA
RINGS • SPIRALS • COILS • REELS
SPOOLS • SHEETS • GASKETS
THERE'S A BELMONT PACKING FOR EVERY SERVICE

FREE...

for the asking

GET IT!!

IF you are responsible for the efficient operation of air conditioning equipment, send for a FREE copy of this handy little booklet.

It tells you what to do about lime scale. How to get rid of it. How to prevent it from forming. And the booklet discusses that other enemy of efficiency . . . slime. Describes simple, low-cost ways to prevent it from fouling up lines, tanks and spray jets.

Other items of interest: Cleaning finned coils of air washers, cleaning aluminum plates and screens, descaling cold diffusers, cleaning filter screens.

For your free copy, simply drop us a line TODAY. Oakite Products, Inc., 18A Rector St., New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING

OAKITE

MATERIALS · METHODS · SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

Spray-Type Stack-Dust Collectors Being Studied

A research project to develop engineering design data on spray-type stack-dust collectors has been initiated by BITUMINOUS COAL RESEARCH, INC., the national research association for bituminous coal. The project has three objectives: (1) to reduce emission during soot blowing at commercial and industrial boiler plants, (2) to minimize corrosion and other forms of stack deterioration caused by water sprays, and (3) to publish the engineering data to help boiler plants operate within city stack-emission requirements.

The Coal Producers Committee for Smoke Abatement, through its chairman, H. B. Lammers, had urged such a study by BCR, as had several members of the Air Pollution Control Association during their national meeting in 1953.

These groups and BCR want to find ways to reduce or eliminate the dust nuisance created when soot is blown from industrial boilers about once a day. The soot cannot be left on the boiler surfaces without materially cutting down the efficiency of the plant.

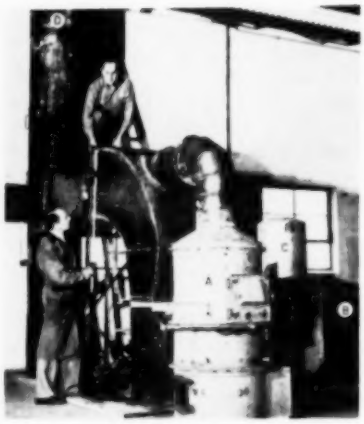
An installation of a 2 ft diameter steel stack has been made inside the BCR laboratory, 980 Kinnear Road, Columbus 8, Ohio. Heated air and flue gas are to be supplied to the stack at 300 to 500 F to stimulate normal stack gas. Weighted quantities of standardized dust obtained from boiler breechings, dust collectors, and stacks are to be introduced into the gas system in a steady stream when equilibrium gas conditions have been attained.

During the period of dust introduction, measured quantities of water will be sprayed into the stack from a nozzle in the stack. Nozzle pressure can be varied by compressed air to achieve the desired flow rates.

Water and solids collected at the base of the stack will be weighed to determine the collection efficiency for each test. Dust escaping and the water evaporated will be calculated. The effect of the spray in cooling the flue gas and in reducing the draft will be determined from the test data, and the acidity of the liquid collected will be measured.

After the first pattern of tests has been completed, succeeding tests can be planned to determine the effect of: spray patterns, water-particle size, nozzle numbers, size, angle of spray, water pressure, wetting agents, acid neutralizers, and corrosion inhibitors.

After the laboratory program is completed and field installations are evaluated, a BCR AID-TO-INDUSTRY publication will be issued.



Installation's main components are the furnace (A), stoker (B), and tank (C) to supply water to the spray nozzle located at the axis of the stack at point (D).

Preston Joins Chemstrand

Appointment of ABRAHAM D. PRESTON as technical personnel manager for THE CHEMSTRAND CORPORATION was announced recently by L. E. STONE, manager of personnel relations.

Mr. Preston will be responsible for recruiting additional technical personnel to staff Chemstrand's plants located at DECATUR, ALA., and PENSACOLA, FLORIDA.

Prior to joining Chemstrand Mr. Preston was personnel representative for E. I. du Pont de Nemours & Co., Inc., at Wilmington, Delaware. He also has served in a personnel supervisory capacity with the Atlantic Refining Company at Philadelphia. During both these periods, he was an instructor at the Drexel Institute of Technology evening school at Philadelphia.

He is a native of Huntington, West Virginia and received a bachelor of science degree in industrial engineering from Virginia Polytechnic Institute.

Shell Chemical—Houston

The world's largest epoxy resin plant has just been brought on stream in HOUSTON, TEXAS, by SHELL CHEMICAL CORPORATION, to triple the company's supply of Epon resins—materials in great demand in both the surface coatings and the structural fields.

Shell Chemical is also opening a bis-phenol-A plant, which makes this new unit independent of outside suppliers for this component of Epon resins. The manufacture of epichlorohydrin, the other chief component of these resins, was pioneered by Shell Chemical.

New G.E. Plant—Roanoke

As a result of forecasted higher demands for large industrial control equipment, GENERAL ELECTRIC plans to build a new multi-million dollar plant in ROANOKE COUNTY, VIRGINIA. The transfer of the department from Schenectady to the new 100-acre site will release facilities for expansion of other departments in the Schenectady Works.

The new plant will occupy 600,000 sq ft of floor space, include a modern two-story office building, an engineering and development laboratory, an employee cafeteria, dispensary, auditorium, employee store, and a total manufacturing area of approximately 450,000 sq ft.

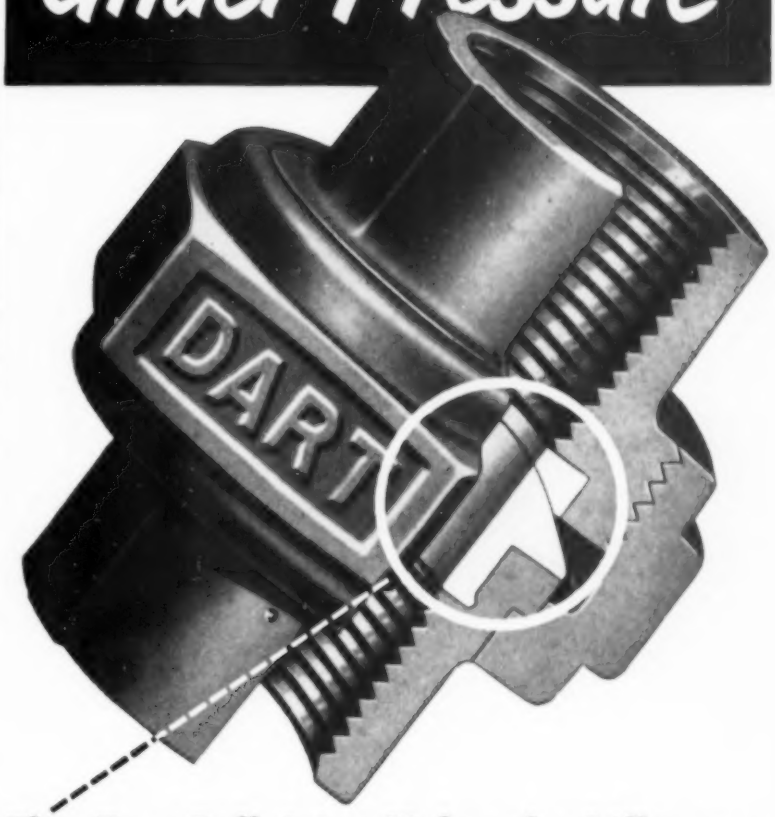
Expected to be in full operation by late 1957, the plant will produce electrical controls for steel mills, paper mills, rubber mills, machine tools, materials handling equipment, and the food, chemical, and printing industries. Total employment is expected to be approximately 2000, including a large number of key personnel who will be moved from Schenectady.

Marley Co. Opens New Plant at Louisville, Ky.

THE MARLEY COMPANY, KANSAS CITY, MISSOURI, has built a new plant in LOUISVILLE, KY., to meet demand for mechanical draft cooling towers for air conditioning and refrigeration service. The new plant replaces Marley's former manufacturing facilities in Louisville.

Occupying ten acres, the plant provides 77,000 sq ft of production space, and is equipped with the most modern machinery for rapid fabrication of packaged water cooling towers. Here steel "Aquatowers" are being

WORKS WELL
Under Pressure



***This* True Ball Joint Makes the Difference**

Dart malleable iron unions, sizes ⅛" to 2" are recommended for 300 lbs. working steam pressure; sizes 2½" to 4" for 250 lbs. working steam pressure at temperatures not over 500° F. Darts give a snug, drop-tight fit easily without excessive wrenching — and you can use them over and over again.

QUICK FACTS

- *Leakproof* because precision-machined to a true ball joint and spherically ground.
- Bronze alloy seats are extra wide, resist pitting and corrosion.
- Shoulders are heavy — can take rough treatment.
- Nut and Body are practically indestructible . . . of air-refined, high test malleable iron.

° Take the pressure off *yourself* — tell your supplier you want *Darts!*

DART
UNIONS

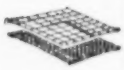
DART UNION COMPANY • PROVIDENCE 5, RHODE ISLAND

The Fairbanks Co. — Distributors: Boston • New York • Pittsburgh • Rome, Ga.

your WIRE CLOTH needs may be in stock at CAMBRIDGE

Supplies of many of the most frequently used types of industrial wire cloth are kept in our warehouse ready for immediate shipment to you. And even if the type you use is not in stock, we can schedule our looms to have your material in your plant without delay. Any metal or alloy; sizes range from 20 x 250 mesh up to 4" openings . . . and accurate mesh count is our pride.

also FABRICATED PARTS



Filter leaves, strainers, sizing screens, etc. We can fabricate most any type of part you need, in any quantity. We'll work from your own prints or, if none are available, our Engineering Department will draw up prints from your description of what the part must do. Once you've O.K.'d them, we'll start production.

Why not have us quote on your next order for wire cloth in bulk or fabricated parts? Write direct or call in your Cambridge field engineer. He's listed under "Wire Cloth" in your classified phone directory.

FREE CATALOG gives full range of wire cloth available, also shows fabrication facilities and includes valuable metallurgical data. Write for your copy today.

The Cambridge Wire Cloth Co.

Dept. Y • Cambridge 5, Md.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN LEADING INDUSTRIAL AREAS

manufactured in a complete range of standard sizes to meet every cooling requirement in the 2 to 60 ton range. In addition, new all steel counterflow towers are being fabricated for large capacity water cooling service. Another product of this facility is the company's line of "DriCooler" air cooled heat exchangers.

Immediately adjacent to the new plant The Marley Company has optioned 4½ acres in anticipation of still further expansion. The new plant supplements Marley's other manufacturing facilities in Kansas City, Kansas; Stockton, California; and Houston, Texas.

Goodyear—Mo. & S. E.

ROBERT J. BURNS, an industrial products field representative at Chicago for GOODYEAR TIRE & RUBBER Co., has been appointed ST. LOUIS district manager for the firm's Industrial Products division.

K. E. REED, field representative at JACKSONVILLE, FLA., has taken over at MADISONVILLE, KY. P. P. PERCICH, field representative at CHATTANOOGA, TENN., is now at the Jacksonville post. And H. V. ATKINSON, formerly at ATLANTA, replaces Percich at Chattanooga.

Exide Ind. Div.—Atlanta

THE ELECTRIC STORAGE BATTERY COMPANY, 1246 Allene Ave., S. W., ATLANTA, GEORGIA, announces that two operating divisions have been established—one for industrial products and the other for automotive products—to permit greater specialization and concentration of effort.

Each division is headed by a general manager having responsibility for sales, manufacturing, engineering and related functions. The Exide Industrial Division operates in the southeast with JOSEPH A. CRONK as Branch Sales Manager. The Atlanta Branch Staff is dispersed in the territory as follows: H. T. BARRETT, Sales-Service Engineer, ATLANTA, GEORGIA; A. W. BELDEN, JR., Sales-Service Engineer, JACKSONVILLE, FLORIDA; J. F. HEMBREE, Sales-Service Engineer, CHARLOTTE, NORTH CAROLINA; and G. D. REID, Sales-Service Engineer, BIRMINGHAM, ALABAMA.

Bay State Abrasive Names M. J. Phillips—Southeast

MARVIN J. PHILLIPS, with headquarters in MARIETTA, GEORGIA, has been appointed an abrasive engineer for BAY STATE ABRASIVE PRODUCTS Co., Westboro, Mass. He will service the Carolinas, Virginia, and part of Tennessee.

Marvin J. Phillips

Prior to this appointment Mr. Phillips was Supervisor of Grinding Wheel Purchases at the Lockheed Aircraft Corp., Marietta; and Assistant Buyer at General Motors Corp.'s Buick-Oldsmobile-Pontiac plant at Doraville, Georgia.

Nat'l Cylinder Gas—Fla.

NATIONAL CYLINDER GAS COMPANY has placed a new oxygen plant in operation at TAMPA, FLA. The company manufactures industrial gases and welding and cutting equipment.

Sprague Names Parrish, N. C.

Appointment of ROBERT L. PARRISH as manager of the new plant of the SPRAGUE ELECTRIC Co., now under construction at WEST JEFFERSON, N. C., has been announced. The new plant, which will manufacture capacitors (electrical condensers) for the electrical and electronic industries, will open late this spring.

Mr. Parrish, who has been associated with the main plants of the company for some time, was formerly senior chemical engineer with Abbott Laboratories. A member of the American Institute of Chemical Engineers, Mr. Parrish is a graduate of the Georgia Institute of Technology and holds a masters degree in chemical engineering from the University of Tennessee.

Nordberg—Southwest

Appointment of RICHARD H. MCCARTHY as Sales Engineer, is announced by the Heavy Machinery Division, NORDBERG MANUFACTURING COMPANY, Milwaukee 1, Wis.

McCarthy will have headquarters at 419 Cotton Exchange Building, DALLAS 1, TEXAS, serving North and Central Texas, Oklahoma, and New Mexico.

American Chain & Cable Names Griffith—Atlanta

NELSON G. GRIFFITH has been appointed Sales Manager for the new Atlanta sales district of the Wire Rope Divisions, AMERICAN CHAIN & CABLE COMPANY, INC. He will make his headquarters at 1401 Howell Mill Road, N.W., ATLANTA, GEORGIA.

Nelson G. Griffith

Six states—Georgia, Florida, Alabama, Mississippi, Tennessee and South Carolina—are included in this new sales district.

Plant Maintenance Aids

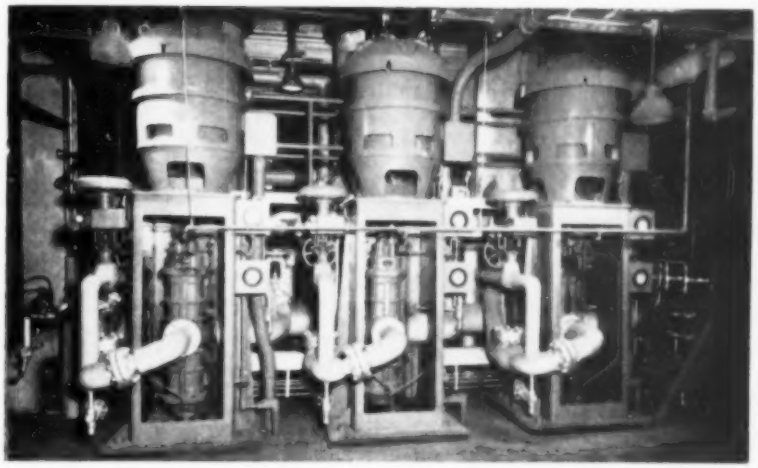
Leading manufacturers have made available on-the-job maintenance aids—valuable catalogs, bulletins, check-charts, etc.

Unit heater maintenance . . . adhesives . . . pipe insulation . . . how to stop condensate corrosion . . . vibration control . . . maintenance paints . . . pulley lagging method . . . and tips on selecting scaffolds will be of special interest to plant maintenance men.

These on-the-job aids are available for the asking without cost or obligation. For details check page 158.

WARREN-QUIMBY SCREW PUMPS USED in the PROCESS of GENERATING STEAM for the WORLD'S TWO HIGHEST TEMPERATURE STEAM TURBINES at

Public Service Electric and Gas Company



ENGINEERING progress marches on and the installation of two of the world's first 1100°F. steam turbines at the new Kearny Station of Public Service Electric and Gas Company in New Jersey, marks another important advancement. Two 145,000 kw. reheat units have initial temperature of 1100°F., pressure of 2350 psig, and reheat temperature of 1050°F. Utilizing these advanced steam conditions results in definitely lower generating costs.

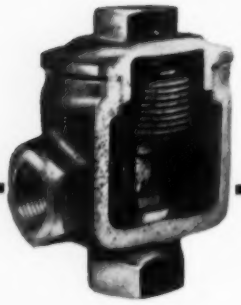
Three Warren-Quimby Gear-in-Head, Vertical Screw Pumps were selected for fuel oil service in connection with this important installation. These pumps are of cast steel with center bearing, and handle Bunker "C" fuel oil at an operating temperature of 125 to 135°F.; viscosity 1500 to 2500 S. S. U.; capacity, 180 g.p.m.; 1150 r.p.m.; suction pressure, 20" Hg. lift; discharge pressure 775 psig.

Keep in step with progress . . . specify: WARREN QUIMBY PUMPS

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts



for total heat of steam at pressure applied

use **STERLING**

THERMOSTATIC TRAPS

Large capacity—Freeze proof—bronze body—Stainless steel valve stem and seat.

Capacity 1900—11,650 lbs per hr. Pressures—5-200 psi.

Multiple trapping with Sterling will save you money.

Write to

STERLING ENGINEERING & MFG. CORP.

143 Business St., Hyde Park 36 BOSTON, MASS.

Nothing conveys an impression of quality and prestige more readily than a perfect business card designed by us.

A letter from you will bring an assortment of the business cards we have made for others.

THE JOHN B. WIGGINS CO.

636 So. Federal Street, Chicago 5

WIGGINS

Peerless Book Form

CARDS

WHAT'S NEW in Plant Maintenance

Free literature on what's new in maintenance equipment and supplies is offered by leading manufacturers. For your free copy, circle the item number on one of the service post cards provided on pages 17 and 18.

Q-1 **PORTABLE BAND SAW**—Bulletin, 4 pages—Illustrates and describes new metal-cutting completely portable band saw, to replace hand hack saws and supplementary stationary equipment. Photographs show application and operation.—PORTER-CABLE MACHINE COMPANY, Syracuse 8, N. Y.

Q-2 **HEATER MAINTENANCE**—Check Chart & Bulletin IH-9—Chart tabulates points to be checked in unit heater maintenance. Bulletin covers installation and maintenance procedures for the company's line of industrial heaters.—L. J. WING MFG. CO., Vreeland Mills Road, Linden, N. J.

Q-3 **STATIONARY VACUUM SYSTEMS**—Bulletin A-939, 12 pages—Analyzes problem of industrial dust and describes complete line of vacuum cleaning equipment designed to combat it. Covers portable separators, water traps, material intake valves, electric bag shakers, and rotary discharge valves.—U. S. HOFFMAN MACHINERY CORPORATION, 105 Fourth Ave., New York, N. Y.

Q-4 **POWER MACHINES**—Power Machine Catalog, 16 pages—Covers dimensions, capacities, offering specifications, dies available and accessories for five pipe machines and power drives. Illustrated with line drawings and photographs.—BEAVER PIPE TOOLS, INC., 500-500 Dana Ave., Warren, Ohio.

Q-5 **ADHESIVES**—Bulletins 452 and 650—Describes adhesives for rigid materials difficult to bond, including the A-6 adhesive which is an entirely new thermosetting epoxy resin formulation designed for bonding aluminum to aluminum with only contact pressure and at moderate temperatures.—ARMSTRONG PRODUCTS COMPANY, P. O. Box 1, Warsaw, Ind.

Q-6 **RUST PREVENTIVES**—General Catalog No. 253, 20 pages—Features 94 color chips and includes complete instructions for surface preparation and application of Rust-Oleum primers, short oil type, long oil type, machinery finishes, chemical and heat resistant types, sealers, thinning oils, and floor and masonry coatings.—RUST-OLEUM CORPORATION, 2799 Oakton St., Evanston, Ill.

Q-7 **PIPE INSULATION**—Technical Data Manual, 18 pages—Illustrates and describes Gilsulate insulation for hot underground pipes, including grades, determination of ditch size, efficiency, specifications, design method and procedure; resistance factor nomographs; temperature gradient, and size of structure.—AMERICAN GILSONITE COMPANY, 134 W. Broadway, Salt Lake City, Utah.

Q-8 **CORROSION INHIBITOR**—Bulletin "VPI," 4 pages—Describes a slowly vaporizing corrosion inhibitor which preserves the surface of metal by forming a protective atmosphere, which functions in the presence of such corrosive inducing agents as moisture and oxygen, rather than removing them.—SHELL OIL COMPANY, 50 West 50th St., New York 20, N. Y.

Q-9 **CONDENSATE CORROSION**—Bulletin No. 35, 4 pages—Tells what causes condensate corrosion in return lines, tanks, and heaters, and how to stop it with Nalco 35 and liquid amine treatment and 35-FM organic liquid. Illustrated.—NATIONAL ALUMINATE CORPORATION, 6216 West 66th Place, Chicago 38, Ill.

Q-10 **VIBRATION CONTROL**—Catalog ER-702, 4 pages—Illustrates and describes Elasto-Rib pad type insulation material, designed to stop transmission of vibration and noise by utilizing the elastic and damping properties of both cork and rubber, available in sheets to be cut to size as needed.—THE KORFUND CO., INC., 48-15 Thirty-second Place, Long Island City 1, N. Y.

Q-11 **STAPLING HAMMER**—Bulletin, 2 pages—Describes the H4 heavy duty stapling hammer for use in general maintenance work. Lists uses and specific applications in various industries. Illustrated.—BOSTITCH, Westerly, R. I.

Q-12 **TRANSMISSION BELT SPLICING**—Handbook, 32 pages—Tells how to splice rubber transmission belts by means of the Flylock belt joint designed to create a strong yet flexible joint without butted outside plies that open at the surface and gradually pull apart. Lists tools and material required. Each step of procedure illustrated by photographs.—THE B. F. GOODRICH COMPANY, Akron, Ohio.

Q-13 **PROTECTIVE DEVICES**—Catalog 154, 12 pages—Illustrates and describes portable high test equipment for checking and calibrating current operated protective devices in chemical, textile, food processing, paper, metal, and other manufacturing plants and utilities.—MULTI-AMP CORPORATION, 10 Third St., Newark, N. J.

Q-14 **MAINTENANCE SERVICES**—Catalog, 16 pages—Describes maintenance services offered for brick and masonry building exteriors, industrial plants, tanks, etc. General data on Palladium mastic protective coatings. Photographs show specific plant applications.—EMJAY MAINTENANCE ENGINEERS, Equipment Manufacturers of N. J., Inc., Rutherford, N. J.

Q-15 **RADIAL SAW BLADES**—Booklet, 4 pages—Describes new line of low-cost carbide-tipped blades for use with radial saws in such operations as making difficult compound miter cuts; cutting plywood panels to size; ripping solid stock at speeds up to 90 fpm; making intricate cuts in hardwoods; and cutting heavy aluminum channel and plastics.—DELTA POWER TOOL DIVISION, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Q-16 **PORTABLE ELECTRIC TOOLS**—1953 Standard Catalog, 16 pages—Lists portable electric tools including drills, hole saws, screw drivers, bits, wrenches, shears, sanders, and many other items. Ordering information gives sizes, catalog numbers, prices and other pertinent data.—THE BLACK & DECKER MFG. CO., Towson 4, Md.

Q-17 **THREAD REPAIR**—Bulletin No. 654, 4 pages—Shows how threads that have been stripped or worn can be repaired quickly and permanently by Heli-Coil screw thread inserts. Tables give selection data. Repair procedure is illustrated with photographs.—HELI-COIL CORPORATION, Danbury, Conn.

Q-18 **WATER REPELLING PRODUCTS**—A.I.A. File No. 2-B-4, 8 pages—Discusses integral waterproofing by means of Medusa waterproofed gray cements, waterproofed white cement, waterproofing paste, and waterproofing powder. Describes methods of application. Illustrated with photographs.—MEDUSA PORTLAND CEMENT COMPANY, 1000 Midland Bldg., Cleveland 15, Ohio.

Q-19 **ELECTRICAL INSULATION RESISTANCE** — Booklet 21-P-8, 24 pages—Practical discussion of insulation resistance testing, with many maintenance hints for electrical equipment in industrial plants. Illustrated with photographs, line drawings, cartoons, and charts.—JAMES G. BIDDLE CO., 1316 Arch St., Philadelphia 7, Pa.

Q-20 **ELECTRICAL TAPES**—Booklet, 12 pages—Tells how "Scotch" brand electrical tapes speed up electric motor construction and repair, with specifications for 16 different electrical tapes for a wide variety of insulation and holding applications in motor work. Covers electrical insulation resin for complete encapsulation of motor coils against corrosive vapors, moisture, oil and shock.—MINNESOTA MINING AND MANUFACTURING CO., 900 Fauquier St., St. Paul 6, Minn.

Q-21 **VOLT-AMMETER**—Catalog No. 124, 4 pages—Describes Amprobe pocket-sized snap-around volt-ammeter which measures current without shutting down equipment. Illustrates models available and gives specifications and applications.—PYRAMID INSTRUMENT CORPORATION, Lynbrook, N. Y.

Q-22 **MAINTENANCE PAINTS**—"Engineered Color" Catalog, 16 pages—gives numerous color chips of different types of paint with suggested uses in industrial plants. Covers interior and exterior specifications, repaint work, new work, primers, varnishes, color and the safety program, and other pertinent data.—BARRELED SUNLIGHT PAINT COMPANY, Southern Department, P. O. Box 1365, Providence, R. I.

Q-23 **TUBE WORKING TOOLS**—Catalog No. 3011-A, 20 pages—Describes complete range of tools for cutting, flaring, bending, swedging, reaming and pinch-off of tubing. Photographs illustrate tools and components. Specifications included.—THE IMPERIAL BRASS MANUFACTURING CO., 1200 W. Harrison St., Chicago 7, Ill.

Q-24 **RESIN COATINGS**—Folder VG, 8 pages—Reports on decreased maintenance costs, extended service life and other advantages afforded by Bakelite resin coatings for general industrial uses. Photographs illustrate actual case histories.—BAKELITE DIVISION, a Division of Union Carbide and Carbon Corp., 300 Madison Ave., New York 17, N. Y.

Q-25 **PULLEY LAGGING METHOD** — Bulletin, 2 pages—Describes new pulley lagging method which employs cured Neoprene sheet cold bonded to pulley surface without rivets. Tells how to clean pulley surface; apply primer; apply bonding agent; apply "Neolag"; form a tight joint. Illustrated.—MAIN PRODUCTS CORPORATION, Dept. 192, 1241 Carpenter St., Philadelphia 27, Pa.

Q-26 **MAINTENANCE SCAFFOLDS** — Bulletin G-295R, 8 pages—Guide for selection of the right ladder or scaffold for all plant maintenance operations by breaking down maintenance work into painting and cleaning; electrical work and equipment maintenance; plant repair and maintenance; and special jobs.—THE PATENT SCAFFOLDING CO., INC., 38-21 Twelfth St., Long Island City 1, N. Y.

Q-27 **WOODWORKING MACHINES** — Bulletin R-2, 6 pages—Describes radial arm multi-purpose woodworking machine, especially suitable for plant maintenance applications, available in models from ½ hp to 10 hp. Photographs show use in various plant operations.—DE WALT, INC., Lancaster, Pa.

Free Reader Service

Free literature on the latest developments in equipment and supplies is offered by leading manufacturers.

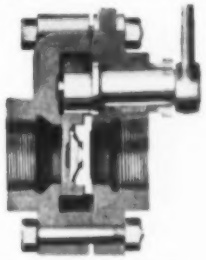
For your copy, circle the item number on one of the reader service post cards provided on pages 17 and 18.

EVERLASTING VALVES

Mean "Everlasting" Protection on these duties

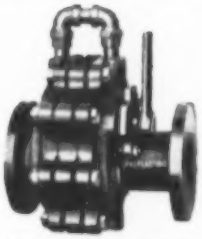
BOILER BLOW-OFF

Quick-opening, also hand-wheel operated. Angle and "Y" types and combination units meeting ASME Code requirements for pressures up to 600 psi.



GENERAL SERVICE

Wherever frequent use and quick operation is required for any liquid or gas at pressures up to 300 psi. These valves have outside stuffing box and gland.

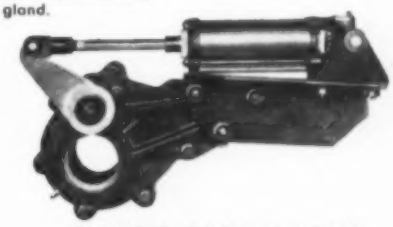


STEAM JACKETED

Assure continued free flow of any material which congeals at ordinary temperatures.

EMERGENCY PROTECTION

Closing type for inflammable liquid emergency shut-off, or opening type for deluge or drainage, assuring immediate and positive action with weighted pendulum stop.



CYLINDER-OPERATED VALVE

for accurate control of process work. Straight-through flow, drop-tight seal, air or hydraulic control for operation at any speed.

EVERLASTING FEATURES

For more than 40 years, EVERLASTING VALVES have been known for their ingenious design, simple, sturdy construction, and long trouble-free life with low maintenance expense. Some of their distinctive features are:

Quick-Action . . . Opened or closed with less than a quarter turn of the operating lever.

Straight-Through Flow . . . the disc cannot become loose and accidentally check the flow.

Drop-Tight Seal . . . constant contact of disc and seat at all times prevents dirt or scale from getting between.

Self Regrinding . . . the disc rotates on the seat with each operation, thus regrinding the sealing surfaces.

No Wedge Action . . . all parts move between parallel faces.

Write for bulletin describing* EVERLASTING VALVES *in detail.

EVERLASTING VALVE COMPANY 53 Fisk Street, Jersey City 5, N. J.

Everlasting Valves

TRADE MARK EVERLASTING REG U S PAT OFF

EV 301

for everlasting protection

Books for the Plant Engineer

Water-Sewerage Short Course

PUBLISHED BY THE ENGINEERING EXPERIMENT STATION
Louisiana State University, Baton Rouge, La.
Price, $1.00

"Proceedings of the Sixteenth Annual Short Course for Water and Sewerage Plant Superintendents and Operators, March 18, 19, 20, 1953" is available from Louisiana State University. It is identified as Bulletin No. 41.

Cooling Tower Wood Maintenance

PUBLISHED BY COOLING TOWER INSTITUTE
444 Emerson St., Palo Alto, Calif.
14 pages
Price, 20¢ each

Discussions and conclusions presented in this Summary Report of Technical Sub-Committee No. 3 on Cooling Tower Wood Maintenance are based primarily on, and limited to, a statistical analysis of data obtained from the direct examination of 103 operating cooling towers in the Gulf Coast area extending from Brownsville, Texas to Baton Rouge, La. Photographs show typical samples of degraded material.

Single copies of this CTI Bulletin TSC-302 are available free of charge from the Cooling Tower Institute, and additional copies are 20¢ each.

Elementary Fluid Mechanics

BY JOHN K. VENNARD
PUBLISHED BY JOHN WILEY & SONS, INC.
440 Fourth Ave., New York 16, N. Y.
401 pages
Price, $5.50

In this Third Edition of Elementary Fluid Mechanics, the author concerns himself with those basic principles which lead to the solution of numerous diversified problems, seeking results which are widely applicable to similar fluid situations. It is intended for the beginner who knows the principles of basic mathematics and mechanics but has had no previous experience with fluid phenomena.

History of American Industrial Science

BY DR. COURTNEY ROBERT HALL
PUBLISHED BY LIBRARY PUBLISHERS
8 West 40th St., New York 18, N. Y.
453 pages
Price, $4.95

This volume describes American industrial development and its relation to our advancement in scientific knowledge. Its contents range from agricultural to atomic energy; from dairy products to detergents. A comprehensive index refers to thousands of names, places and products.

Aether and Electricity

BY SIR EDMUND WHITTAKER
PUBLISHED BY THE PHILOSOPHICAL LIBRARY, INC.
15 East 40th St., New York 16, N. Y.
320 pages
Price, $8.75

The purpose of this volume is to describe the revolution in physics which took place from 1900 to 1926, and which included the discoveries of Special Relativity, the older Quantum Theory, General Relativity, Matrix Mechanics and Wave Mechanics.

A Complete **anti-friction** *Bearing Service*

MOFFATT BEARINGS COMPANY

219 W. MOREHEAD ST. Charlotte N. C. Phone 6-6577
432 LUCKIE ST. N. W. Atlanta, Ga. Phone LAmar 2831
700 THIRD AVE., NORTH Birmingham 4, Alabama Phone 53-2591
805 HOGAN ST. Jacksonville 2, Fla. Phone 6-7100

CARECO ONE-PIECE FURNACE LINING
Reg U.S. TRADE MARK Pat Off
For REPAIRING or LINING
A PLASTIC LINING USED IN PLACE OF FIRE BRICK

LONGER LASTING BOILER FURNACES

Boiler furnaces lined with CARECO last two to four times longer than those lined with fire brick. Write for quotation.

CAROLINA REFRACTORIES COMPANY
HARTSVILLE, S. C.

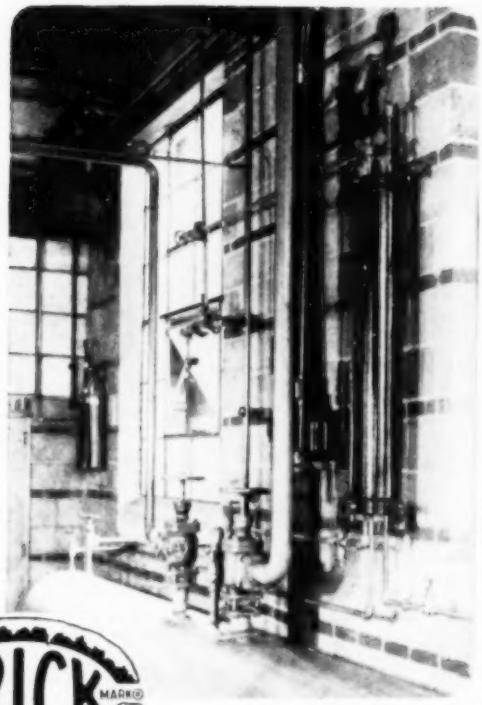
FUNDAMENTALS OF BOILER PLANT ENGINEERING
(Basic Principles of Steam Plant Practice)
By A. D. HOLLAND
Assoc. Prof. of Mech. Engr., Georgia School of Technology

"Fundamentals of Boiler Plant Engineering"—is different from most handbooks in that it goes into the fundamental principles of boiler plant operation. It is written so that it can be studied by those who have not had an opportunity to learn these basic laws; at the same time its many charts, tables and formulae make it a valuable reference book for the trained engineer.

The basic principles covered in this book have such wide application that it will be extremely helpful to refrigeration, air conditioning, textile and hydraulic engineers and master mechanics. Stiff cover, cloth binding, 4½ x 7 inches, 232 pages, 37 tables, 55 illustrations, 30 memorandum pages for your special notations. "FUNDAMENTALS OF BOILER PLANT ENGINEERING" may be secured with a 3-year subscription to SOUTHERN POWER & INDUSTRY for $3.00.

Take advantage of this special offer while it lasts. Write today to

SOUTHERN POWER & INDUSTRY
806 PEACHTREE ST., N.E. ATLANTA 5, GEORGIA



TRADE FRICK MARK®

ELECTRONIC PURGERS PAY FOR THEMSELVES . . .

Engineers have for years relied on purgers for removing air and other non-condensable gases from refrigerating systems.

Ammo Head Pressure	Brake Hp. per Ton Refrig. 5 Lb. Suct.	15 Lb. Suct.	25 Lb. Suct.
215	2.48	1.85	1.52
205	2.42	1.78	1.47
195	2.36	1.72	1.41
185	2.3	1.66	1.37
175	2.22	1.61	1.32
165	2.15	1.57	1.27
155	2.1	1.50	1.21

Worthwhile savings in horsepower are made by reducing head pressure with a purger.

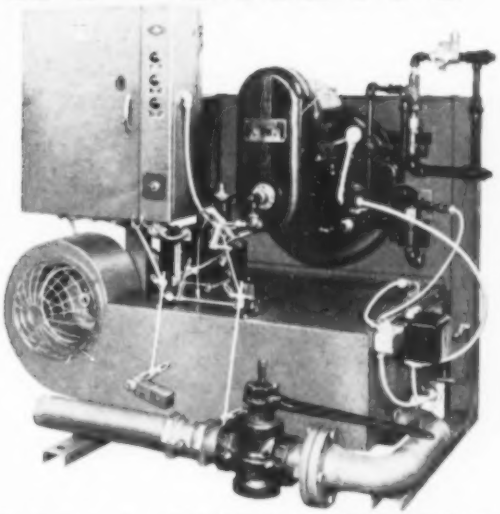
Larger plants find that automatic purgers save labor as well as power and refrigerant. If you operate an ammonia system of considerable size, check into the merits of the Frick Electronic Purger. Write for Bulletin 199-A, featuring this better automatic equipment.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

WEBSTER ROTONETIC*



DUAL FUEL FIRING BURNER

- √ Sizes from 75 to 300 horsepower.
- √ Minimum gas pressure requirements.
- √ Low installation costs.
- √ Maximum efficiencies on BOTH gas and oil.
- √ Minimum base height requirements.
- √ Utilizes all grades of fuel oil.
- √ Extremely low noise level.
- √ Approved electronic combustion safeguard system.
- √ Simpler changeover than ever before.
- √ One hundred per cent forced draft.
- √ Completely assembled, piped, wired and tested.

These and many other outstanding features combine to provide the same dependable high quality performance as the WEBSTER DYNETIC gas burner. Neither fuel must suffer if the WEBSTER ROTONETIC is used. With integral pumps, integral oil preheaters for heavy oils, patented oil burner "flame-shaping" vanes, and full modulating or optional high-low control, the WEBSTER ROTONETIC is designed to provide long lasting customer satisfaction the year around.

It is furnished with a precast refractory front as an integral part of the burner assembly. The installer need only finish the furnace wall on each side and above the burner.

Listed by Underwriters' Laboratories, Inc.

*Trademark

Write For Literature

The WEBSTER ENGINEERING COMPANY

TULSA, OKLAHOMA

Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

CLASSIFIED ADS

CLASSIFIED RATES

$6.00 per column inch

$12.00 per column inch displayed

Rates quoted on special types of repeated advertisements.

Classified rates are net, payable in advance, each month. Rates are based on column inch, with three columns per page, 10 inches per column, column width 2¼ inches—a total of 30 column inches per page. Special "Position Wanted" Advertisements submitted by individuals seeking employment, 10 cents per word per insertion, payment with order, minimum charge $2.00. When used, Box Number address c/o SOUTHERN POWER & INDUSTRY, 806 Peachtree Street, N.E. Atlanta 5, Georgia, count as eight words.

POSITION WANTED

Graduate Mechanical Engineer, Age 33, nine years service engineer, leading boiler manufacturer, desires power plant engineering job in Southeast. Write Box 222, c/o SOUTHERN POWER & INDUSTRY, 806 Peachtree St., N.E., Atlanta 5, Ga.

FOR SALE

2—Vilter Freon Compressors, 13¼" x 10½" Vertical Duplex type
Driven by
1—225 H.P. Synchronous Motor, 3 Phase—60 Cycle—220 Volts—277 R.P.M.—Complete with Exciter and Controls
Also
1—Shell and Tube Condenser—48" x 20'0" for use with above compressors, including all necessary valves and fittings.
Above machinery all in excellent condition. Used only 2 years for air conditioning.

Will sell all or any part at rock bottom prices

INDUSTRIAL SUPPLY COMPANY
501 N. Cortez St., New Orleans, La. Audubon 3761

GLAZER STEEL CORPORATION

Structural and Plate Steel Fabricators

Open capacity for quick delivery now available. We solicit your inquiries for Steel Fabrication and Warehouse Steel Products. Let us figure your jobs . . . Large or Small.

Contact us at either New Orleans or Knoxville

P. O. Box 807
New Orleans, La.
Phone, Express 2761

P. O. Box 1390
Knoxville, Tenn.
Phone 4-8601

SAFETY VALVE REPAIRS

Announcing the opening in the South of a high pressure Safety Valve Repair Service organization. Safety and relief valves repaired and set, up to 2000 psi. New valve guarantee. Gate, Globe and Check valves also rebuilt. Factory trained personnel. Field service available. Work performed either in our factory or in your plant if within a 400 mile radius of Jacksonville. Complete insurance coverage carried. For particulars write:

SOUTHERN VALVE CORPORATION
2939 West Beaver Street Jacksonville, Florida

WANTED — POSITION — MANAGEMENT, APPLICATION, LIAISON ENGINEER

Mechanical Engineer, 49, married, Scotch-Irish. Experienced in Steam and Power Field. B.S.M.E. (Industrial Engineering) University of Michigan '28. Registered Prof. Engr. States of Ohio, Louisiana, Alabama. Member—A.S.M.E.—Instr. Soc. of Amer.—Birmingham.

Engineering Society—Louisiana Engineering Society. Twenty-five years experience field contact as Sales engineer. Desires change to Management, Application Engineer.

Liaison with Engineering and field men, purchasing. Available May 1st. Write Box 221, c/o SOUTHERN POWER & INDUSTRY, 806 Peachtree St., N.E., Atlanta 5, Ga.

DIXIE ENGINEERING COMPANY

"Manufacturer's Agents"

P. O. Box 750 812-813 Protective Life Building
BIRMINGHAM 3, ALABAMA
Sabel E. Baum Telephone 4-0417

ALTON L. HICKS

Employment Specialist 15th Year

- Technical
- Sales
- Administrative
- Professional

c/o The Private Employment Service
403-4 Chamber of Commerce Bldg.
MAin 8992 Atlanta, Ga.

GAGE GLASSES AND

High Pressure Rubber Gaskets
ALL SIZES TO FIT YOUR GAGES

ERNST WATER COLUMN & GAGE CO.
Send for Catalog LIVINGSTON, N. J.

transformers

built to your specifications

Take advantage of our more than 40 years' experience in manufacturing and re-building industrial transformers. Complete satisfaction guaranteed.

Send us your specifications for prompt quotation

"TRANSFORMER HEADQUARTERS"
Manufactured – Bought – Sold – Repaired

THE ELECTRIC SERVICE CO., INC.
5323 Hetzel St., Cincinnati 27, Ohio

Used BOILER BARGAINS

These are not just listings; they are IN STOCK, traded in on New boilers. Most have been inspected and are ready for immediate use.

SAVE TIME—MONEY—TROUBLE
CALL TODAY

Here is a partial list, RATINGS BASED ON 10 SQUARE FEET

UPRIGHTS
(Vertical Tubular)
1— 6 H. P.—100 lb. W. P.
1—10 H. P.—100 lb. W. P.
1—35 H. P.—100 lb. W. P.

FIREBOX BOILERS
(One and two pass)
1—Kewanee —87 H. P.—100 lb. W. P.
1—Lucey —80 H. P.—100 lb. W. P.
1—Marion —50 H. P.—100 lb. W. P.

HOT WATER BOILER
1—Cleaver Brooks Model WHT

SCOTCH BOILERS
1— 25 H. P.— 15 lb. W. P.
1— 40 H. P.—100 lb. W. P.
1—250 H. P.—150 lb. W. P. (Used less than 12 months, available in July)

WATER TUBE
1—Mund — 37.5 H. P.—125 lb. W. P.
1—Erie —300 H. P.—150 lb. W. P.
1—B&W —250 H. P.—160 lb. W. P.

STEAM GENERATORS
1—Ames—80 H. P.—125 lb. W. P.
(This rating ONLY based on Maximum capacity)

ECONOMIC
1—Erie 150 H. P.—150 lb. W. P.

HEATING BOILERS
1—Kewanee 7L78 Type C
1—Fitzgibbons—OE-122 129 (sq. ft. heating surface) with S-80 H. W. Coil

AND OTHERS

Most of these boilers are available with used or new Oil Burners, (#6 or #2), Coal Stokers, Gas Burners, Automatic Feed Water Systems, Stacks, Insulation, and/or other accessories.

GOOD, USED FEED WATER PUMPS
1—Fairbanks-Morse QSZS close-coupled with 10 H. P. 3450 RPM, 230 Volt, 3 phase Motor.
1—Fairbanks-Morse Westco BR2-615 B. F.
1—Worthington DDE 1½ close-coupled with 25 H. P. 3450 RPM, 230 Volt, 3 phase Motor.
1—Worthington 1½ D4, 3 H. P., 3 phase, 230 Volt Motor.
1—Burks, 76E25 with 5 H. P., 1750 RPM, 3 phase, 230 Volt Motor.
1—Hoffman Van Pump VV-52, 5000 EDR, 230 Volt, 3 phase.
1—Aurora Vertical condensation unit, Model MA.

AND MANY OTHERS

ALSO, RELIEF VALVES, LOW WATER CUT-OFFS . . . EVERYTHING IN STEAM.

SAVE TIME—MONEY—TROUBLE

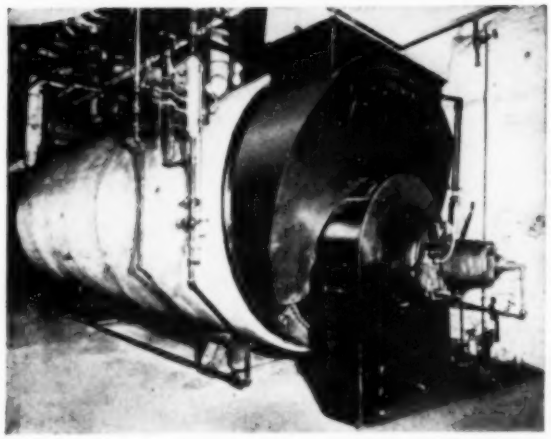
Call or Wire Today — Collect

INDUSTRIAL EQUIPMENT COMPANY
Thomasville, Georgia, Phone 840
Orlando, Florida, Phone 5-1588
Atlanta, Ray Heat Equip. Co.
Phone EV 1058

FARRAR & TREFTS, INC.

Established 1863

20 Milburn Street, Buffalo 12, New York



INSTALLATION OF 300 H.P. SCOTCH BOILER

BISON BOILERS

Heating and Power Boilers in sizes ranging from 10 H.P. to 350 H.P.

API-ASME • ASME CODE

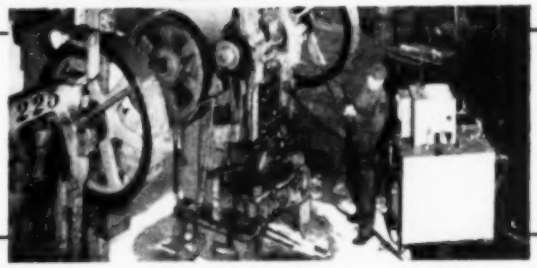
Quality Boilers To Give Quality Service

***See Sweets' Catalog**

CLEAN YOUR MACHINES

in place, during working hours

SPEEDYLECTRIC STEAM-JET CLEANER



No need to move machines for clean-up when you use a Speedylectric. Wheel this portable, all-electric steam jet cleaner to the machine — apply *dry* steam and solvent as desired, under finger-tip control — the hot *dry* steam blasts off encrusted dirt and sludge *fast*. One man can do the work of five — reach those hard-to-get spots while nearby machines continue production. There's no flooding, no fumes, no flame — Speedylectric is safe! Nearby operators undisturbed.

A Speedylectric will pay for itself in time saved, with dividends in cleaner, more efficient machines.

Get the full story on what a Speedylectric Steam-Jet Cleaner can do in your plant. Request Bulletin 74-16 today.

Representatives in principal cities

Livingstone Engineering Company

Manufacturers of Steam Generator

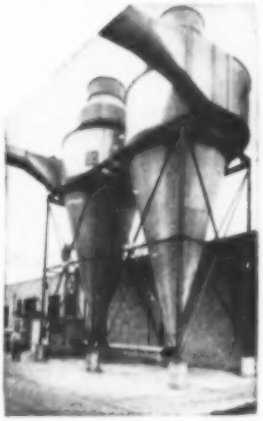
100 Grove Street • Worcester 5, Mass.

world's largest maker of **hardwood floors**

selects

KIRK AND BLUM

dust control



"Our feeling was that you could give us better engineering and workmanship . . . we were not disappointed."

E. L. BRUCE CO.,
Memphis, Tennessee

Two of a number of the new, more efficient "Type C" KIRK & BLUM Centrifugal collectors serving this modern woodworking plant.

E. L. Bruce Company, the world's largest manufacturer of hardwood floors, selected KIRK & BLUM to revamp and modernize their dust control system.

In the Bruce plant, Kirk & Blum engineers provided a flexibility and efficiency in operation never before attained. "Unitized" systems permit operation of any line or combination of lines, independent of the others. This provides versatility of operation as production requires. In the flooring finishing department, two independent systems provide the same versatility.

Kirk & Blum can show you how new or increased Dust Control capacity can improve efficiency in your plant.

Write for Literature
The Kirk & Blum Mfg. Co.,
4198 Forrer Ave.,
Cincinnati 9, Ohio.

Collectors atop Bruce Power plant. Power generated from wood waste is used throughout the flooring manufacturing and finishing operation.

ADVERTISER'S INDEX

This Advertisers' Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert

A

Adam Cook's Sons, Inc. ... 140
Air Preheater Corp. ... 111
Allen-Bradley Co. ... *
Allen-Sherman Hoff Co. ... 29
Allis-Chalmers Mfg. Co. ... Second Cover
AMC Supply Co. ... *
American Blower Corp. ... *
American Cancer Society ... 58
American Engineering Co., Stoker Div. ... *
American Locomotive Co., Alco Products Div. ... *
American Monorail Co. ... 129
Anaconda Wire Cable Co. ... 21
Annin Co. ... *
Armstrong Machine Works ... 89
Atlantic Steel Company ... 133
Atlas Valve Co. ... *

B

Babbitt Steam Specialty Co. ... 166
Babcock & Wilcox (Boilers) ... 44 and 45
Babcock & Wilcox Refractory Div. ... *
Bailey Meter Co. ... 10
Belco Industrial Equipment Div. ... *
Bell & Zoller Coal Co. ... *
Belmont Packing & Rubber Co. ... 153
Bird-Archer Co. ... 149
Bituminous Coal Institute ... 20
Blackmer Pump Co. ... *
Blaw-Knox Co. (Grating) ... 137
Blaw-Knox Co., Power Piping Division ... *
Boiler Engineering & Supply Co. ... 34
Boiler Tube Co. of America ... 136
Buell Engineering Co., Inc. ... 54
Buffalo Forge Co. ... 139
Bunting Brass & Bronze Co. ... *
Bussmann Mfg. Co. ... *
Byers Co., A. M. ... 95

C

Cambridge Wire Cloth Co. ... 156
Carolina Refractories Co. ... 160
Catawissa Valve & Fitting Co. ... 150
Chapman Valve Mfg. Co. ... 68
Chesapeake & Ohio Railway Co. ... 62
Chicago Bridge & Iron Co. ... 23
Childers Mfg. Co. ... 51
Clarage Fan Co. ... *
Classified Ads ... 162
Cleaver Brooks Co.—Boiler Division ... *
Cochrane Corporation ... 13
Cole Mfg. Co., R. D. ... *
Combustion Engrg., Inc. ... 101
Combustion Equipment Division, Todd Shipyards Corp. ... 138
Condenser Service & Engineering Co., Inc. ... 132
Continental Gin Co. ... 2
Cooper-Bessemer Corp. ... *
Copes-Vulcan Division — Continental Foundry & Machine Co. ... 59
Coppus Engineering Corp. ... *
Crane Company ... 127
Custodis Construction Co. ... *
Cyclotherm Corp. ... *

D

Dart Union Co. ... 155
DeLaval Steam Turbine Co. ... *
Detroit Stoker Co. ... 105
Diamond Chain Co., Inc. ... 9
Dowell, Inc. ... Fourth Cover
Duraметallic Corp. ... *

E

Edward Valves, Inc. ... *
Electric Service Co. ... 162
Electric Wheel Company ... 165
Emerson Elec. Mfg. Co. ... *
Engineer Co. ... 144
Erie City Iron Works ... *
Ernst Water Column & Gage Co. ... 162
Everlasting Valve Co. ... 159

F

Fairbanks Co. ... *
Falk Corp. ... *
Farrar & Trefts ... 163
Finnigan, J. J., Co., Inc. ... 165
Fisher Governor Co. ... 40 and 41
Fiske Bros. Refining Co., Lubriplate Div. ... *
Flash-Stone Company, Inc. ... 22
Flexible Steel Lacing Co. ... 148
Fluor Corp., Ltd. ... 49
Foster Engineering Co. ... 142
Foster Wheeler Corp. ... *
Frick Company ... 161

G

Gal-Tronics Corporation ... 152
Garlock Packing Co. ... 26
General Cable Corp. ... 30
General Coal Co. ... *
General Electric Co. ... 42 and 43
Glazer Steel Corp. ... 162
Goulds Pumps, Inc. ... *
Graver Water Conditioning Co. ... *
Grinnell Co., Inc. ... 25
Gulf Oil Corp. ... 33
Gustin-Bacon Mfg. Co. ... 114

H

Hagan Corp. (Boiler Water Conditioning) ... *
Hagan Corp. (Combustion Control) ... *
Hall Laboratories, Inc. ... *

I

Industrial Crane & Hoist Corp. ... *
Industrial Equipment Co. ... 162
Ingersoll-Rand Co. ... *
International Chimney Corp. ... 121
Iron Fireman Mfg. Co. ... *
Ironton Fire Brick Co. ... *
I-T-E Circuit Breaker Co. ... 4 and 5

J

Jacksonville Blow Pipe Co. ... 166
Jefferson Union Co. ... *
Jenkins Bros. ... Third Cover
Jerguson Gage & Valve Co. ... *
Johns-Manville, Inc. ... *

K

Kellogg Company, M. W. ... *
Kerrigan Iron Works, Inc. ... 7
Kirk & Blum Mfg. Co. ... 163

L

Ladish Co. ... *
Leslie Co. ... 115
Liberty Engineering & Mfg. Co. ... 163
Lindberg Engineering Co. ... 117
Link-Belt Co. ... 48
Livingstone Engineering Co. ... 163
Louden Machinery Co. ... *
Lovejoy Flexible Coupling Co. ... 130
Lowell Wrench Company ... 134
Lubriplate Division, Fiske Bros. Refining Co. ... *
Lucey Boiler & Mfg. Corp. ... 131

M

McAlear Manufacturing Co. ... *
Madden Corp. ... *
Manning, Maxwell & Moore, Inc. ... 32
Manzel, Inc. ... 135
Marley Co., Inc. ... *
Mason-Neilan Regulator Co. ... 46 and 47
Metallizing Engineering Co., Inc. ... 39
Midwest Piping Co., Inc. ... *
Moffatt Bearing Company ... 160

N

National Airoil Burner Co. ... *
National Aluminate Corp. ... 1
National Conveyor Co., Inc. ... 118
National Supply Co., Spang-Chalfant Div. ... 87
National Tube Co. ... *
National Valve & Mfg. Co. ... 163
Niagara Blower Co. ... *
Nicholson & Co., W. H. ... 15

O

Oakite Products, Inc. ... 154
Ohio Injector Co. ... 107
Okonite Co. ... *
O'Neal Steel Works ... *
Orr Semblower, Inc. ... 68

P

Pacific Pumps, Inc. ... 19
Penalarm Products, Inc. ... *
Panellit, Inc. ... *
Peerless Boiler & Engineering Co. ... *
Peerless Pump Division Food Machinery & Chemical Corp. ... 125
Permutit Co. ... *
Petro ... 55
Philadelphia Gear Works ... 57
Pittsburgh Piping & Equipment Co. ... 63
Plibrico Company ... 145
Porter, Inc., H. K. ... 146
Powell Valves ... 31
Powers Regulator Co. ... 27
Frat-Daniel Corp. ... 123

R

Raybestos-Manhattan, Inc., Packing Division ... 50
Reliance Gauge Column Co. ... 141
Republic Flow Meters Co. ... 119
Riley Stoker Corp. ... 52 and 53

S

Sarco Co., Inc. ... 61
Shell Oil Co. ... 11
Sinclair Refining Co. ... 113
Southern Natural Gas Co. ... 24
Southern Power & Industry ... 151-166
Southern Railway System ... 56
Sprague Electric Co. ... *
Springfield Boiler Co. ... *
Standard Oil Co. of Ky. ... *
Sterling Electric Motors, Inc. ... 93
Sterling Engineering and Mfg. Corp. ... 158
Subox, Inc. ... 143
Superior Combustion Industries, Inc. ... 89

T

Taylor Forge & Pipe Works ... 97
Terry Steam Turbine Co., The ... *
Texas Co. ... *
Thermix Corp. ... 123
Thread-Ezy Mfg. Co. ... *
Todd Shipyards Combustion Equipment Div. ... 138

U

Union Asbestos & Rubber Co. ... *
U. S. Hoffman Machy. Corp. ... 165
United States Rubber Co. ... *
United States Steel Co. ... *

W

Wagner Electric Co. ... *
Walworth Co. ... 60
Want Ads ... 162
Warren Steam Pump Co., Inc. ... 157
Webster Engineering Co. ... 161
Western Precipitation Corp. ... 28
Wicks Boiler Co. ... *
Wiegand Co., Edwin L. ... 109
Wiggins Co., John B. ... 158
Wilson, Inc., Thomas C. ... 166
Wing Mfg. Co., L. J. ... 147

Y

Yarnall-Waring Co. ... 64, 65 and 91

DUST PROBLEM?

Sweeping stirs up dust and moves it to a new location; air hose cleaning is both costly and dangerous. Vacuum cleaning removes plant dust safely, rapidly and economically.

Hoffman Vacuum Cleaning Equipment is available in permanently piped stationary systems or in four sizes of portable units. Hoffman dust removal systems may be used to remove all types of plant dust, to empty low pressure dust collectors or for many other material removal applications.

Write for a free brochure on dust and its removal.

Hoffman also builds a complete line of blowers and exhausters for industrial use.

AIR APPLIANCE DIVISION

U. S. HOFFMAN MACHINERY CORP.
92 East 12th St.
New York 3, N. Y.

Hoffman

9,000 gal. pressure tank fabricated in FINNIGAN'S modern shop for plant in Lake Charles, La. Dia. 78"—Length 38'

build FINNIGAN quality INTO YOUR PRESSURE VESSELS!

TANKS,
SMOKESTACKS
PIPING, BREECHING
WATER HEATERS
PLATE WORK
BOILERS

Pressure vessels fabricated by FINNIGAN are built to rigid ASME Codes! Over 65 years of plate fabrications have given FINNIGAN Engineers and Craftsmen the know-how to build the finest of equipment. That's why the FINNIGAN *guarantee* can specify that equipment by FINNIGAN is equal to or better than that of any other manufacturer!

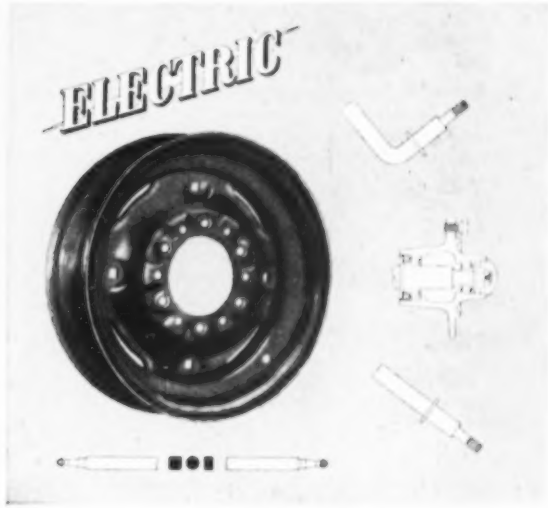
Call, wire or write today for further information . . . there is no obligation.

J. J. FINNIGAN CO.
INC.
722 MARIETTA ST., N.W., ATLANTA

41 E. 42nd St.
New York 17, N.Y.

4108 C. St.
Little Rock, Ark.

P.O. Box 2527
Jacksonville 4, Fla.



A Wheel for Every Job!

Our engineers will recommend the most efficient and economical wheel and axle assembly for your unit. We invite your inquiries.

WRITE US FOR CATALOG
ELECTRIC WHEEL CO.
2810 SPRUCE, QUINCY, ILLINOIS

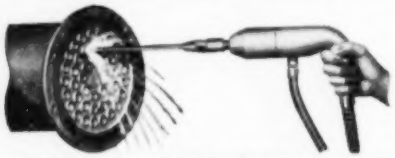
It's a cinch to clean any size heat exchanger tube the Wilson way!

Why put up with the delays and the high costs of makeshift tube cleaning methods? Wilson has exactly the tube cleaner you need to do the job quickly, thoroughly, economically. Wilson's complete line of fast-acting tube cleaners includes the popular PG for ⅜" to 1", the PGX for intermediate sizes ½" to 1½", and the TP-301 for up to 2⅞" ID.

For Small Sizes
MODEL PG
PISTOL GRIP
TUBE CLEANER

The fast, efficient Pistol Grip Tube Cleaner provides the operator with one-hand control for cleaning small, straight tubes. Weighs only 3 lbs—no more than a 12" Stillson wrench.

For Intermediate Sizes
MODEL PGX TUBE CLEANER



Positive drive (not geared down) high speed, rotary shaft, air-driven scavenger type cleaner. Washes out tube and debris as it cleans, keeping drill bit cool at the same time. For either vertical or horizontal applications, straight or curved tubes.

For Heavy-Duty Service
MODEL TP-301
TUBE CLEANER

Suitable for vertical or horizontal use in straight or curved tubes ⅜" ID to 2⅞" ID and up to 40' long. Cleans rapidly, thoroughly, operating at high speed at 90 psi. Can run on pressure as low at 50 psi.

Representatives in all principal cities

WRITE FOR BULLETIN TW-829

Thomas C. Wilson, Inc., 21-11 44th Ave., Long Island City 1, N. Y.
CABLE ADDRESS: "TUBECLEAN" NEW YORK

TW 854

WILSON

TUBE CLEANERS • TUBE EXPANDERS

Patents Pending

The Marvelous Montgomery

BLO-HOG

(The only all-purpose hog in the world)

Eats Up Everything!

. . including Pine, Oak, Gum, Hickory, Elm, Wet Veneer, Round-up and Sandy Bark. Conveyor-fed — no attendant required. Positively protected from major damage by tramp steel. All connections locked — nothing to shake loose. Maintenance costs unbelievably low.

". . . Dear Mr. Montgomery: It is an unbelievable machine and it is still hard to believe that it is actually handling the enormous volume of scrap we are feeding into it. We operate the hog without an attendant —which means a considerable saving. —J. B. Black, Plant Superintendent, Ocala Manufacturing, Ice and Packing Co., Ocala, Fla."

C.I.T. Terms Available

Write for bulletin and details

JACKSONVILLE BLOW PIPE CO.
P. O. Box 3687, Jacksonville, Florida

Cut Fuel & Steam Costs

WITH . . .

Babbitt *Adjustable* **SPROCKET RIM** *with Chain Guide*

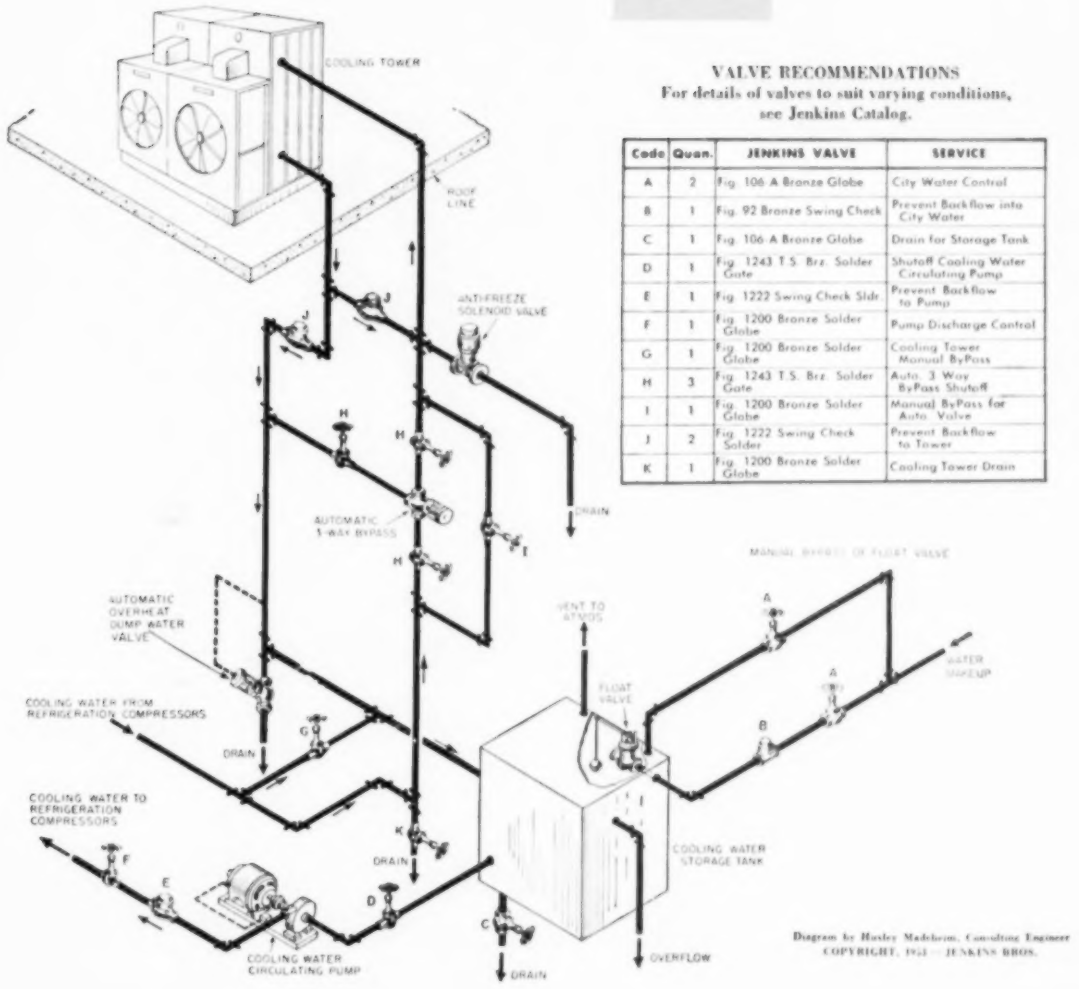
Plan your piping layout for most efficient and economical distribution of steam — place valves where they logically belong, without costly detours to bring overhead piping to floor level. Every overhead valve, wherever placed, is in easy reach with low-cost Babbitt Adjustable Sprocket Rim with Chain Guide. Save steam, fuel and other costs!

- **Reduces piping costs**
- **Fits all valve wheels**
- **First cost is last cost**

Range of 10 adjustable sizes fits all valve wheels from 2 to 30 inches diameter, with rising or non-rising stems. Only four simple, quickly assembled parts.

Call your Industrial Distributor. He carries complete stocks. Or write for descriptive folder and prices.

Babbitt STEAM SPECIALTY CO.
3 BABBITT SQUARE, NEW BEDFORD, MASSACHUSETTS



VALVE RECOMMENDATIONS
For details of valves to suit varying conditions, see Jenkins Catalog.

Code	Quan.	JENKINS VALVE	SERVICE
A	2	Fig. 106 A Bronze Globe	City Water Control
B	1	Fig. 92 Bronze Swing Check	Prevent Backflow into City Water
C	1	Fig. 106 A Bronze Globe	Drain for Storage Tank
D	1	Fig. 1243 T.S. Brz. Solder Gate	Shutoff Cooling Water Circulating Pump
E	1	Fig. 1222 Swing Check Sldr.	Prevent Backflow to Pump
F	1	Fig. 1200 Bronze Solder Globe	Pump Discharge Control
G	1	Fig. 1200 Bronze Solder Globe	Cooling Tower Manual ByPass
H	3	Fig. 1243 T.S. Brz. Solder Gate	Auto. 3 Way ByPass Shutoff
I	1	Fig. 1200 Bronze Solder Globe	Manual ByPass for Auto. Valve
J	2	Fig. 1222 Swing Check Solder	Prevent Backflow to Tower
K	1	Fig. 1200 Bronze Solder Globe	Cooling Tower Drain

Diagram by Hawley Madeheim, Consulting Engineer
COPYRIGHT, 1953 — JENKINS BROS.

How to plan PIPING CONNECTIONS *for a* NON-FREEZE COOLING TOWER

Where uninterrupted refrigeration is a round-the-clock operating requirement, a non-freeze cooling tower of the type illustrated here offers a dependable supply of cooling water at low cost. It also conforms with the water conservation regulations now enforced in many localities.

Since cooling tower and compressors must operate on the same schedule in any continuous refrigeration system—even when temperatures are below freezing the water used in this system is stored in a vented or open tank located in a heated space, rather than in the conventional pan under the exposed tower.

When freezing weather occurs, an anti-freeze solenoid valve, actuated by a temperature-sensitive device, opens to drain all water from lines exposed to outside temperatures. The automatic 3-way solenoid valve permits the water to bypass the cooling tower under freezing conditions, or when it becomes too warm due to fan failure or overload in the storage tank. Under the latter conditions, the automatic overheat dump valve would also open. The subsequent drop of the water level in the storage tank causes the float valve to open and admit city water to make up the deficiency. Thus, in an emergency, city water would be used for cooling.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

To simplify planning, to save time, to get all the advantages of Jenkins specialized valve engineering experience, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

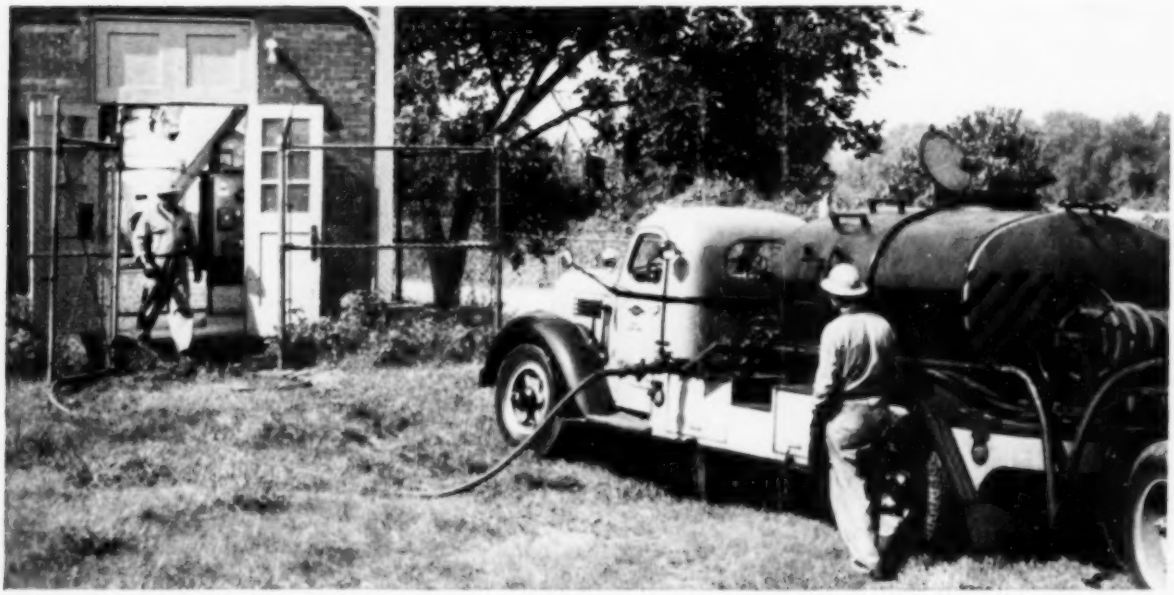
Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 71.

JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864 MADE JENKINS MARK

Jenkins of

WATER WELL PRODUCTION TRIPLED BY DOWELL SERVICE

Chemical treatment removed retarding scale from equipment . . . reduced cost of water



A well drilled to a total depth of 205 feet into Niagara limestone had declined to 70 gallons of water per minute—a rate far below its capacity to produce. Needless to say, management was quite concerned about the increasing costs of its water.

Dowell Service was called in to survey the job. First tests showed the pump to be clogged badly with iron deposits. Other tests showed the entire well system to be fouled with the same material.

After a Dowell acidizing treatment, the well produced 230 gallons of water per minute—its original capacity! Management was so pleased with these results that a program of periodic maintenance treatments was instituted for *all* its water and waste disposal wells and auxiliary equipment.

How about your equipment? Is it delivering full capacity for you? If there's any question, call in Dowell for a free estimate. Dowell is equipped to provide chemical cleaning service—with special truck-mounted tanks, mixers, pumps to prepare and deliver necessary solvents . . . and experienced Dowell engineers to do the job for you.

For complete information on how Dowell Service can help solve your production and maintenance problems, call your nearest Dowell office or write to Dowell, Dept. E-26, Tulsa 1, Oklahoma.

DOWELL SERVICE

Over 100 Offices to Serve You with Chemical Cleaning for:

Boilers • Condensers • Heat Exchangers • Cooling Systems
Pipe Lines • Piping Systems • Gas Washers • Process Towers
Process Equipment • Evaporators • Filter Beds • Tanks

Chemical Services for Oil, Gas and Water Wells

DOWELL INCORPORATED · TULSA 1, OKLAHOMA

DOWELL

A Service Subsidiary of
THE DOW CHEMICAL COMPANY